

RBI Grade A/B 2025

QRE 360°

Quant

Topic – Percentage Part 1

Mon to Sat

Mon to Sat

Thurs

Fri

Sat

8:00 AM



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Percentage

300 → 150

- Direct questions can be asked.
- Also used in Profit Loss, Simple Interest, Compound Interest, Data Interpretation.

350 → 150



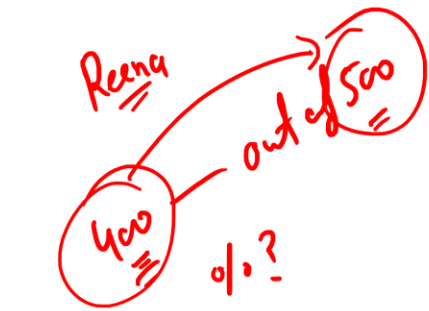
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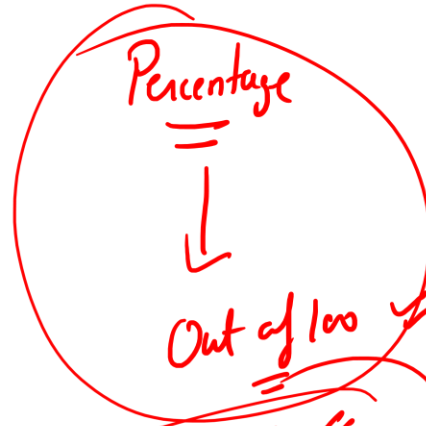


$$\frac{400}{500} \times 100$$

4hr → 20hr

$$\frac{4}{20} \times 100 = 20\%$$

$$\frac{500}{400} = \frac{100}{x} \quad ?$$

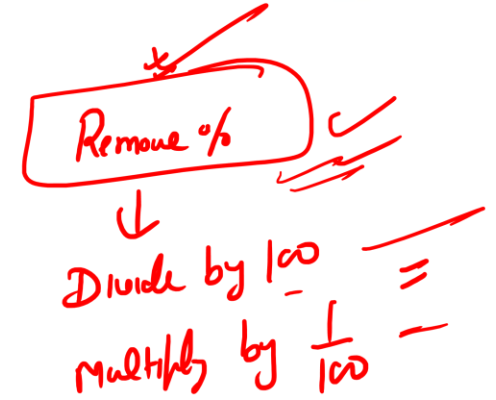
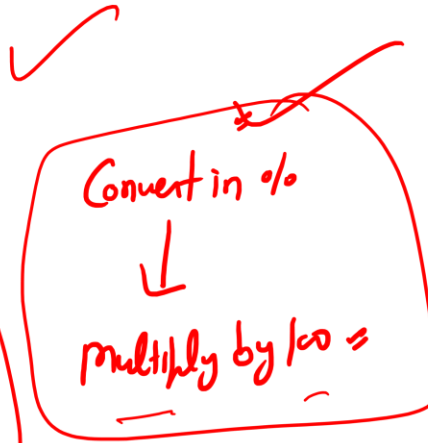


Fraction = $\frac{a}{b}$

Impact

base/original

$$\frac{400}{500} \times 100 = 80\%$$



$$37.5\% \text{ of } 1248$$

$$\frac{37.5}{100} \times 1248$$



Concept

1600 ✓

Basic Percentage

100% = 1600 ✓

50% = 800 ✓

25% = 400 ✓

10% = 160 ✓

5% = 80 ✓

1% = 16 ✓

0.1% =

✓

Concept

1200 ✓

100% = 1200 ✓

200% = 2400 ✓

50% = 600 ✓

25% = 300 ✓

10% = 120.0 ✓

1% = 12 ✓

0.1% = 1.2 ✓

5% = 60 ✓

0.5% = 6 ✓

Basic Percentage

A% of B = B% of A ✓

$$\frac{A}{100} \times B = \frac{B}{100} \times A$$

30% of 50 = 50% of 30
15 = 15 ✓



- 1400
- ✓ 100% = 1400
 - ✓ 50% = 700
 - ✓ 25% = 350
- 10% = 140
=
- 1% = 14 →
- 5% = 70
0.5% = 7
- 0.1% = 1.4

68% of 1400

68
100 → 1400

70% - 2% =

↓ ↓

7 × 10% - 2 × 1%

7 × 140 - 2 × 14

980 - 28

= 952

79% of 1400

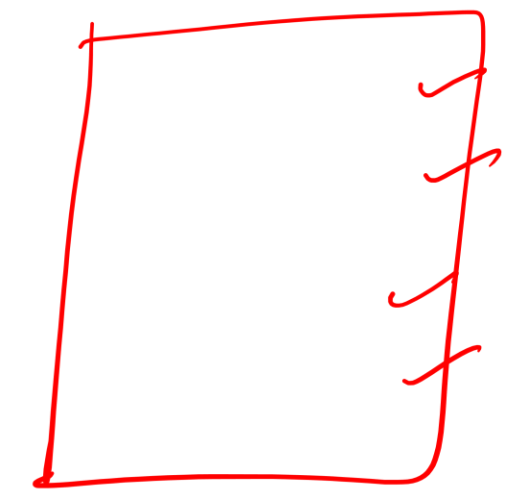
↓

80% - 1%

8 × 140 - 14

1120 - 14

= 1106



① 59% of 1200
 \downarrow
 60% - 1%
 50% + 10% - 1%
 $600 + 120 - 12 = 708$

② 43% of 1300
 \downarrow
 50% - 7%
 $650 - 91 = 559$
 $650 - 50 - 41 = 559$
 $650 - 91 - 9 + 9 = 559$
 $659 - 100 = 559$

③ 47% of 1450 = 14.5
 \downarrow
 50% - 3%
 $725 - 42 - 1.5 = 725 - 43.5 = 681.5$

④ 83% of 1650
 \downarrow
 80% + 3%
 $1320 + 49.5 = 1369.5$



⑤

$$\begin{array}{r} 18 \\ 72 \\ \hline 100 \end{array} \times 1425 = 285$$

⑤

$$\begin{array}{r} 142.5 \\ 72\% \text{ of } 1425 \\ \hline 100\% \\ 70\% + 2\% \\ 997.5 + 28.5 \\ \hline 1026 \end{array}$$

142.5 → 100 ✓
40 ✓
2 ✓
.5 ✓

⑧ 203% of 120 =

Comment =

⑦

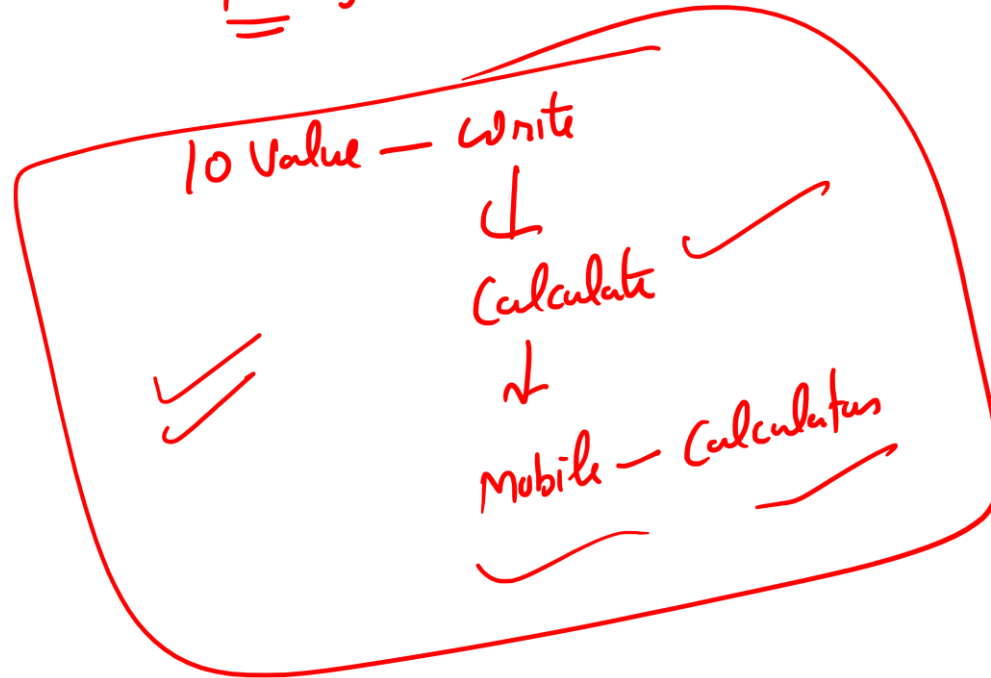
$$\begin{array}{r} 53\% \text{ of } 1680 \\ \hline 168 \\ 50\% + 3\% \\ 840 + 50.4 \\ \hline 890.4 \end{array}$$

⑨

$$\begin{array}{r} 117\% \text{ of } 1340 \\ \hline 134 \\ 100 + 10\% + 7\% \\ 1340 + 134 + 93.8 \\ \hline 227.8 \\ \hline 1567.8 \end{array}$$



Yoursel



27+1930

|

|

|



$$1 = 100\% \quad \checkmark$$

$$\frac{1}{2} = 50\% \quad \checkmark$$

$$\frac{1}{3} = 33\frac{1}{3}\% = 33.33\% \quad \checkmark$$

$$\frac{1}{4} = 25\% \quad \checkmark$$

$$\frac{1}{5} = 20\% \quad \checkmark$$

$$\frac{1}{6} = 16\frac{2}{3}\% = 16.66\% \quad \checkmark$$

Fractions

$$\frac{1}{7} = 14\frac{2}{7}\% = 14.28\% \quad \checkmark$$

$$\frac{1}{8} = 12\frac{1}{2}\% = 12.5\% \quad \checkmark$$

$$\frac{1}{9} = 11\frac{1}{9}\% = 11.11\% \quad \checkmark$$

$$\frac{1}{10} = 10\% \quad \checkmark$$

$$\frac{1}{11} = 9\frac{1}{11}\% = 9.09\% \quad \checkmark$$

$$\frac{1}{12} = 8\frac{1}{3}\% = 8.33\% \quad \checkmark$$

$$\frac{1}{13} = 7\frac{6}{13}\% = 7.69\% \quad \checkmark$$

$$\frac{1}{14} = 7\frac{1}{7}\% = 7.14\% \quad \checkmark$$

$$\frac{1}{15} = 6\frac{2}{3}\% = 6.66\% \quad \checkmark$$

$$\frac{1}{16} = 6\frac{1}{4}\% = 6.25\% \quad \checkmark$$

$$\frac{1}{17} = 5\frac{15}{17}\% = 5.89\% \quad \checkmark$$

$$\frac{1}{18} = 5\frac{5}{9}\% = 5.55\% \quad \checkmark$$

$$\frac{1}{19} = 5\frac{5}{19}\% = 5.26\% \quad \checkmark$$

$$\frac{1}{20} = 5\% \quad \checkmark$$

$$\frac{1}{24} = 4\frac{1}{6}\% = 4.16\% \quad \checkmark$$

$$\frac{1}{25} = 4\% \quad \checkmark$$

$$\frac{1}{30} = 3\frac{1}{3}\% = 3.33\% \quad \checkmark$$

$$\frac{1}{32} = 3\frac{1}{8}\% = 3.125\% \quad \checkmark$$

$$\frac{1}{40} = 2\frac{1}{2}\% = 2.5\% \quad \checkmark$$

$$\frac{1}{50} = 2\% \quad \checkmark$$



$$1 = 100\%$$

dividing both side by same Number.

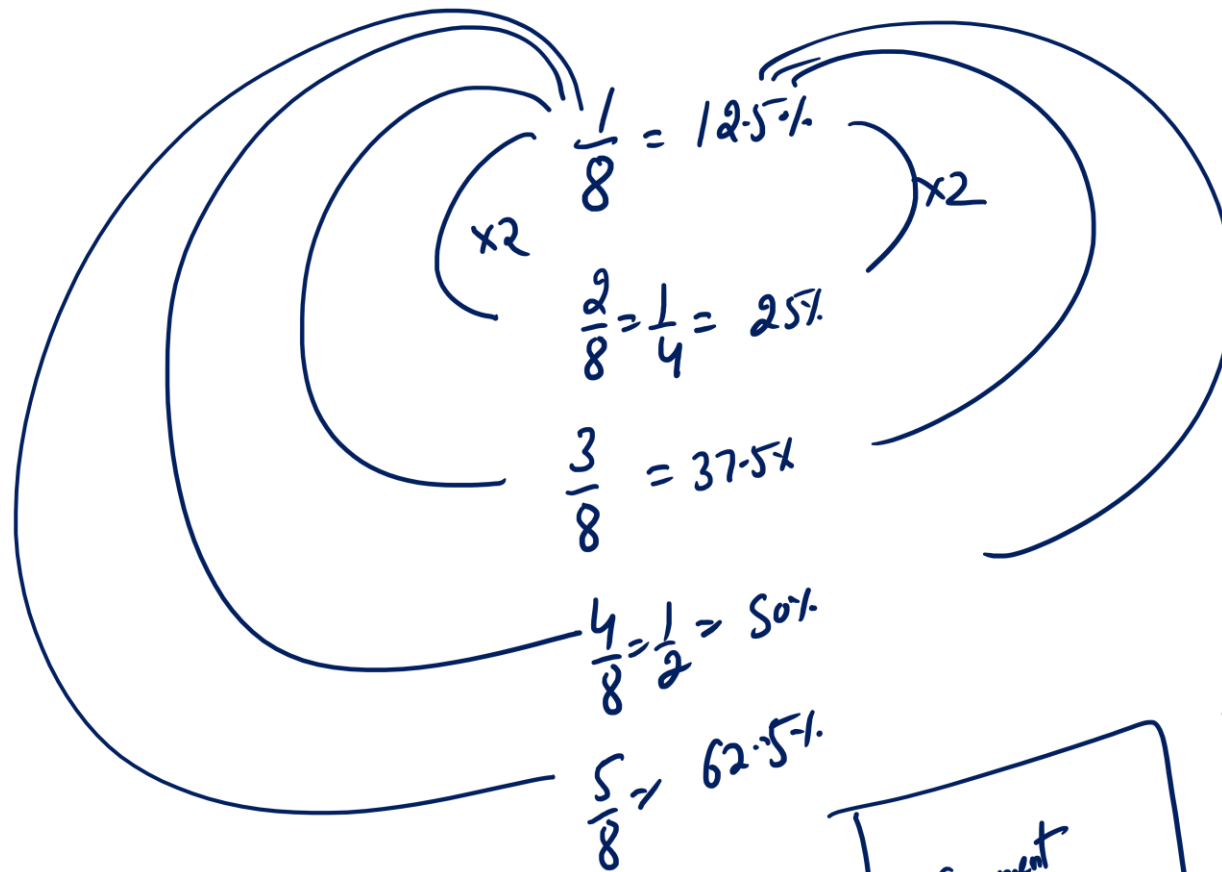
$$\frac{1}{2} = 50\%$$

$$\frac{1}{3} = 33\frac{1}{3}\% = 33.33\%$$

$$\frac{1}{4} = 25\%$$

$$\frac{1}{5} = 20\%$$





$$\begin{aligned} & 62.5\% \text{ of } \underline{1248} \\ & \downarrow \\ & 50\% + 12.5\% \\ & \underline{624} + \underline{156} \\ & = \underline{780} \end{aligned}$$

$$\frac{62.5}{100} \times \frac{1248}{10}$$

Comment



Q.1) Quantity I: 35% of 80 + 125% of 48 - 55% of 40 = ?

$$24 + 48 + 48 + 12 - 20 - 2$$

66

Quantity II: $16 \text{ of } 45 + \sqrt{8649} - 1932 \div 28 = ?^2$

$$720 + 93 - 84 = 729 = 27^2$$

27

Quantity III: $1449 \div 23 + (5365 \div 37) + 1958 \div 89 = ?$

$$63 + 145 + 22 = 185$$

66 > 27 < 185

[1] Quantity I > Quantity II > Quantity III ~~X~~

[2] Quantity III > Quantity II > Quantity I ~~X~~

[3] Quantity II \geq Quantity I = Quantity III

[4] Quantity I > Quantity II < Quantity III ✓

[5] Quantity I = Quantity II = Quantity or Relation cannot be established



Q.2) Quantity I: $(65\% \text{ of } 420 + (513 \div \sqrt{361})) - 124 = ?$

$210 + 42 + 21$

Quantity II: $(493 \div 29) \times (171 \div 9) = ? + 35\% \text{ of } 180$

$54 + 9$

Quantity III: $(\sqrt{11664} + \sqrt[3]{74088}) \times ? = 125 \times 12$

108

42

$273 + 27 - 124 = 176$

$323 - 63 = ? = 260$

$108 + 42 \times x = 1500$
 $= 1392$

$x = \frac{1392}{42}$

$176 < 260 > 42$

[1] Quantity I > Quantity II > Quantity III ~~X~~

[2] Quantity I > Quantity II < Quantity III ~~X~~

[3] Quantity III < Quantity II > Quantity I ✓✓

[4] Quantity II ≥ Quantity I = Quantity III

[5] Quantity I = Quantity II = Quantity or Relation cannot be established



Study the following information carefully and answer the questions.

The given missing table chart shows the percentage distribution of the total number of students who play musical instruments (piano + guitar), the percentage of the number of students who play guitar and the percentage of the number of students who play piano in five different institutes namely A, B, C, D and E.

Institutes	Percentage distribution of the number of students who play musical instruments	Percentage of the number of students who play guitar	Percentage of the number of students who play piano
A	20% = 250	70% = 175	32%
B	26% = 325	-	32% = 104
C	30% = 375	-	-
D	10% = 125	-	-
E	14% = 175	-	56% = 98

Handwritten calculations:

$$325 \times 32\% = 104$$

$$32 \times 325\% = 104$$

$$\frac{96}{8} = 104$$

$$56 \times 175\% = 98$$

$$\frac{56}{285} = \frac{14}{98}$$

Note: Total number of students who play musical instruments in institute A is 250.

Handwritten notes:

$$100\% = 125$$

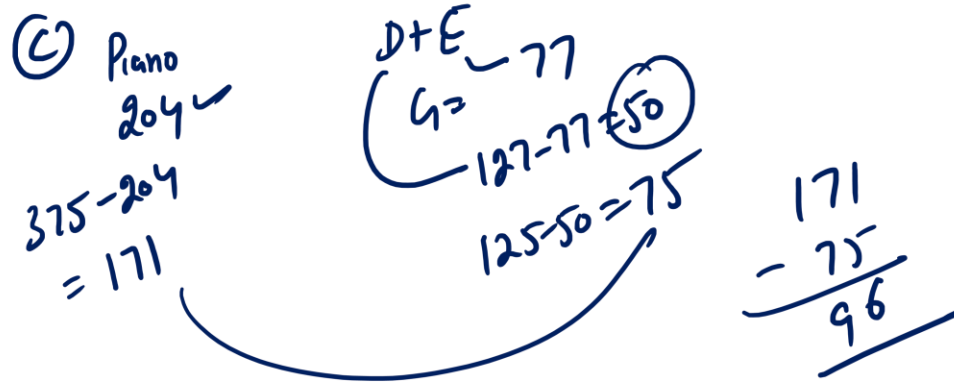
$$20\% = 250$$

$$1\% = \frac{25}{2} = 12.5$$

$$25 + 26 = 51$$

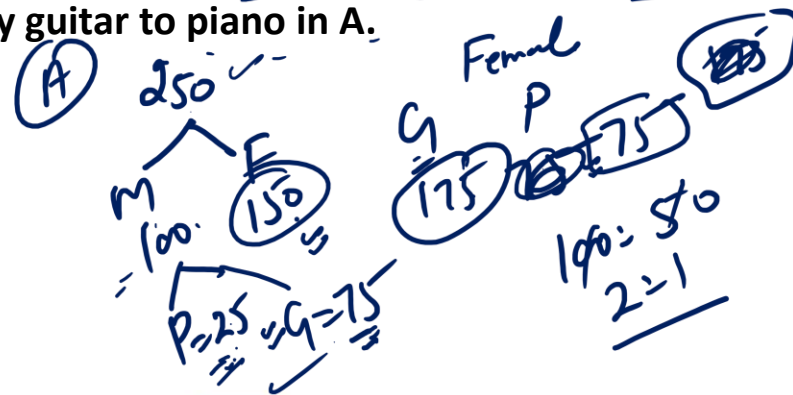

Q.3) If the no. of students who play piano in C is 100 more than that of B and the no. of students who play guitar in D and E together is 127, then find the difference between the no. of students who play guitar in C and the no. of students who play piano in D.

- [1] 96
- [2] 74
- [3] 65
- [4] 82
- [5] 70



Q.4) Out of the total no. of students who play musical instruments in A, 40% are males. If the no. of male students who play piano in A is 1/4th of the total no. of male students who play musical instruments in A, then find the ratio of the no. of females who play guitar to piano in A.

- [1] 1:2
- [2] 3:4
- [3] 2:1
- [4] 4:5
- [5] 4:7



Q.5) The total no. of students who play musical instruments (piano, guitar and flute) in F is 464. If the no. of students who play guitar and flute in F is 21 less and 29 more than the no. of students who play guitar in B, then find the no. of students who play piano in F.

- [1] 14
- [2] 45
- [3] 30
- [4] 26
- [5] 31

Home Work

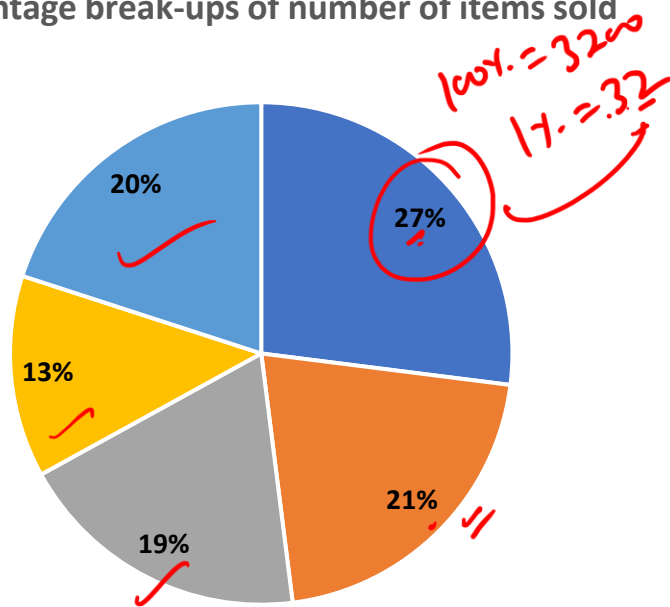


Directions: Study the following information carefully and answer the related questions. First pie-chart given below represents the percentage break up of total number of items (School Bags and Books) sold from different stores and second pie-chart represents the percentage break-up of number of School Bags sold from different stores.

Total number of items (School Bags and Books) sold = 3200

Total number of items (School Bags and Books) sold = 3200

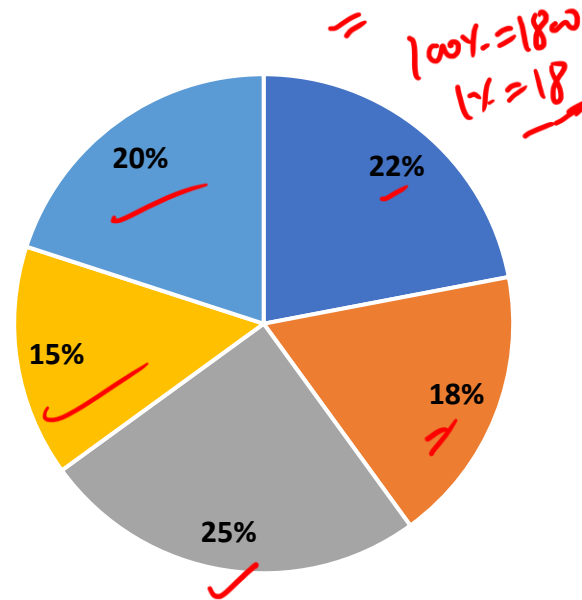
Percentage break-ups of number of items sold



■ Store A ■ Store B ■ Store C ■ Store D ■ Store E

Total number of items School Bags sold = 1800

Percentage break-ups of number of School Bags sold



■ Store A ■ Store B ■ Store C ■ Store D ■ Store E

Store	3200 Bag + Books	1800 Bag	1400 Books
A	864	396	468
B	672	324	348
C	608	450	158
D	416	270	146
E	640	360	280



Q.6) What is the average number of Books sold from stores B and E?

- [1] 304
- [2] 314
- [3] 320
- [4] 328
- [5] 336

$$\frac{348}{280}$$

$$\frac{628}{2} = 314$$

Q.8) Number of School Bags sold from store C is approximately what percentage of total number of items (School Bags and Books) sold from the same store?

- [1] 18%
- [2] 25%
- [3] 64%
- [4] 50%
- [5] 74%

$$\frac{450}{608} = \frac{450}{608} \times \frac{3}{4} = 25\%$$

Q.7) What is the difference between number of School Bags sold from shop B and number of Books sold from shop D?

- [1] 178
- [2] 150
- [3] 124
- [4] 162
- [5] 204

$$\frac{324}{146}$$
$$178$$

Q.9) What is the respective ratio of number of School Bags sold from store C to the number of Books sold from store A?

- [1] 15: 16
- [2] 25: 26
- [3] 17: 26
- [4] 19: 17
- [5] 12: 19

Home Work



Direction (10-13) : Study the following information carefully and answers the questions based on it.

In a Car Expo in the New Delhi, there are a total of 67,200 visitors who visited the car expo. The ratio of number of males to number of females who visited in the car expo is 9: 7 respectively. All the visitors who visited the car expo, visits the six different car company pavilion namely Ford, Maruti, Volkswagen, Toyota, Honda and Nissan. Total number of visitors who visited Ford pavilion is 16,128 which is (P%) of the total number of visitors. Number of female visitors who visited Maruti pavilion is (Q%) of the total number of female visitors who visited car expo and 10,983 less than the total number of visitors who visited Ford pavilion. Number of male visitors who visited Honda pavilion is 15%of the total male visitors. Number of male visitors who visited Volkswagen pavilion is 1890 more than male visitors who visited Honda pavilion and is(R%) of the total number of male visitors who visited car expo. Number of male visitors who visited Maruti pavilion is 1/3rd of the number of female visitors who visited Maruti pavilion. Number of female visitors who visited Toyota pavilion is 7^3 more than the number of male visitors who visited Maruti pavilion and is (S%) of the female visitors who visited Maruti pavilion. Number of female visitors who visited Nissan pavilion is 4410 which is (T%) of the total number of female visitors who visited car expo. Number of male visitors who visited Toyota pavilion is 3 times of the number of female visitors who visited same pavilion. Total number of visitors who visited Honda pavilion is 22% of total visitors. The ratio of male to female visitors who visited Nissan pavilion is 9: 5 respectively.



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Q.10) Find the value of P?

- a. 37
- b. 24
- c. 49
- d. 18
- e. None of these

Q.12) Find the value of S and T respectively?

- a. 17 and 20
- b. 51 and 27
- c. 32 and 22
- d. 40 and 15
- e. None of these

Q.11) Find the value of Q?

- a. 17.5
- b. 10.25
- c. 21
- d. 33.33
- e. None of these

Q.13) Find the value of $[(Q \times S \times T) - (P \times R \times T)]/100$?

- a. 23
- b. $17 \frac{5}{7}$
- c. 33
- d. $16 \frac{2}{3}$
- e. None of these



HomeWork

- ① Q5 } → Comment
- ② Q9 }
- ③ 10 video —

④ → Comment

Thank You

P4Q
+ High

-Monday
Thurs } → 8:00 AM

Burc — High

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QRE 360°

Quant

Topic – Percentage Part 2

Mon

Mon
Th } Quant

→ 8:00 AM

Sat

Exam



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Free Course

1. Information about Eligibility, Pattern and Vacancies
2. Previous Year Questions
3. Strategy and Orientation for Quant, Reasoning, ESI and FM

Percentage

- Direct questions can be asked. ✓
- Also used in Profit Loss, Simple Interest, Compound Interest, Data Interpretation. ✓ ✓ ✓ ✓



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Concept



Basic Percentage

100%=1600

50%=800

25%=400

10%=160

5%=80

1%=16

Basic Percentage

$A\% \text{ of } B = B\% \text{ of } A$



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Fractions

$$1 = 100\%$$

$$\frac{1}{2} = 50\%$$

$$\frac{1}{3} = 33\frac{1}{3}\% = 33.33\%$$

$$\frac{1}{4} = 25\%$$

$$\frac{1}{5} = 20\%$$

$$\frac{1}{6} = 16\frac{2}{3}\% = 16.66\%$$

$$\frac{1}{7} = 14\frac{2}{7}\% = 14.28\%$$

$$\frac{1}{8} = 12\frac{1}{2}\% = 12.5\%$$

$$\frac{1}{9} = 11\frac{1}{9}\% = 11.11\%$$

$$\frac{1}{10} = 10\%$$

$$\frac{1}{11} = 9\frac{1}{11}\% = 9.09\%$$

$$\frac{1}{12} = 8\frac{1}{3}\% = 8.33\%$$

$$\frac{1}{13} = 7\frac{6}{13}\% = 7.69\%$$

$$\frac{1}{14} = 7\frac{1}{7}\% = 7.14\%$$

$$\frac{1}{15} = 6\frac{2}{3}\% = 6.66\%$$

$$\frac{1}{16} = 6\frac{1}{4}\% = 6.25\%$$

$$\frac{1}{17} = 5\frac{15}{17}\% = 5.89\%$$

$$\frac{1}{18} = 5\frac{5}{9}\% = 5.55\%$$

$$\frac{1}{19} = 5\frac{5}{19}\% = 5.26\%$$

$$\frac{1}{20} = 5\%$$

$$\frac{1}{24} = 4\frac{1}{6}\% = 4.16\%$$

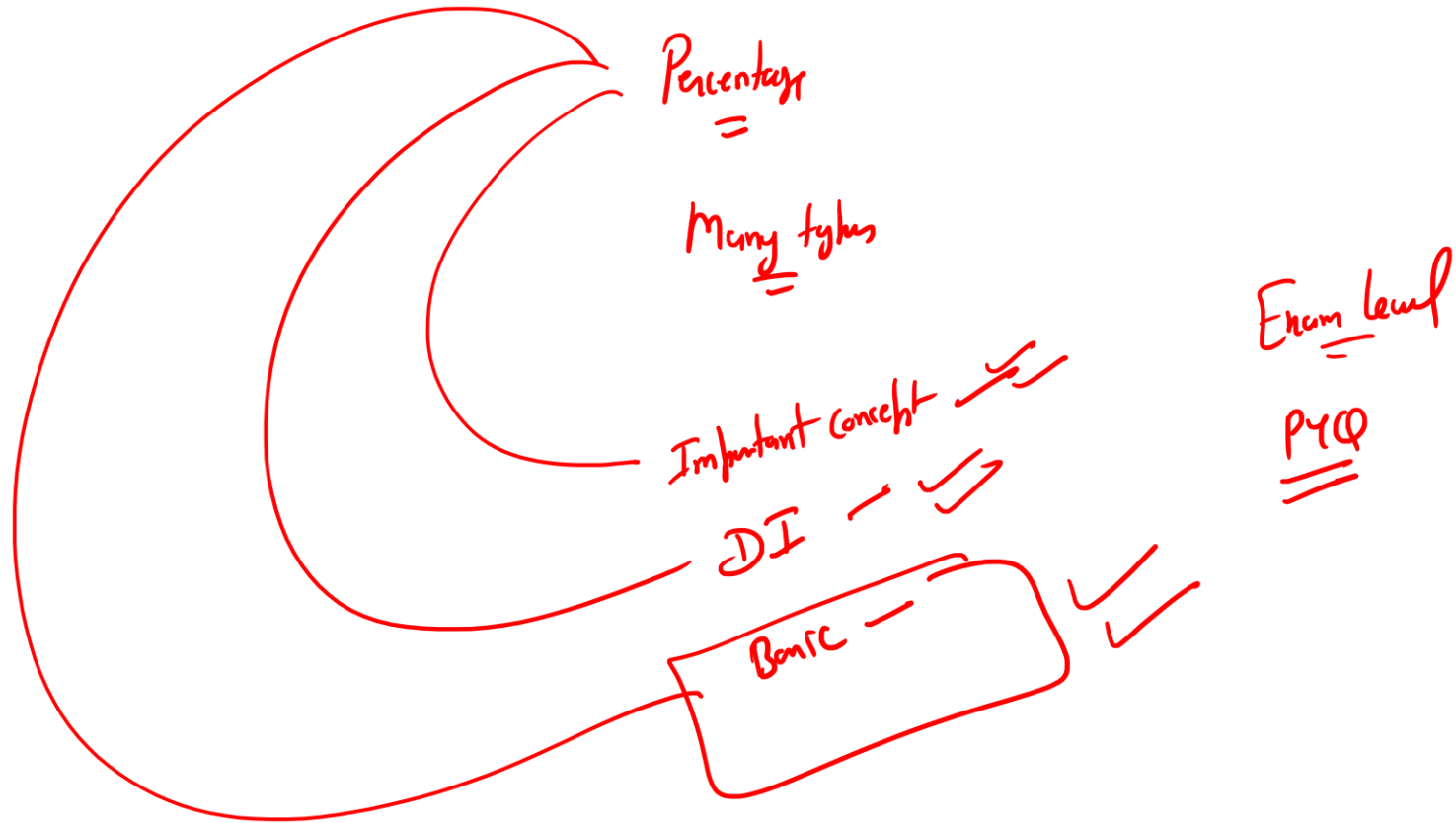
$$\frac{1}{25} = 4\%$$

$$\frac{1}{30} = 3\frac{1}{3}\% = 3.33\%$$

$$\frac{1}{32} = 3\frac{1}{8}\% = 3.125\%$$

$$\frac{1}{40} = 2\frac{1}{2}\% = 2.5\%$$

$$\frac{1}{50} = 2\%$$



Comment



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Direction (1-6): Read the following table carefully and answer the questions given below.

Table shows total number of employees (males + females) in four (K, L, M & N) different companies. Table also shows percentage of male employees and female employees in these companies. Companies total number of Percentage of males & females is $(X + Z)$ % of employees

Companies	Total number of Employees	Percentage of Males	Percentage of Females
K	$1500 = \frac{5}{3} \times Z^2 = \frac{5}{8} \times 30 \times 30$	$20\% = 300$	$80\% = 1200$ $(X+Z)\%$
L	$X+800 = 850$	680 $Y\% = 80\%$	$20\% = 170$
M	$500 =$	$Z=30$ $2Z\% = 60\% = 300$	$40\% = 200$
N	$15Y-200 = 1000$	450 $(X-5)\% = 45\%$	550 $E\% = 55\%$

Note: Ratio of Y to X is 8:5 respectively.

$$X = 50$$

$$Z = 30$$

$$Y = X$$

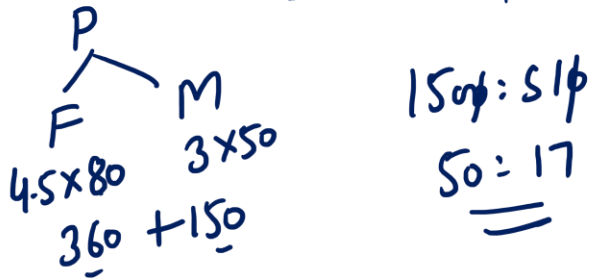
$$8 = 5 \times 10$$

$$\left(\begin{matrix} \times 10 \\ 80 \\ 50 \end{matrix} \right) \times 10$$



Q1. If total number of female employees in company P is '4.5Y' and total number of male employees in company P is '3X', then find the ratio of total employees in company K to company P.

- A. 50:17
- B. 45:19
- C. 54:11
- D. 42: 23
- E. 40: 27



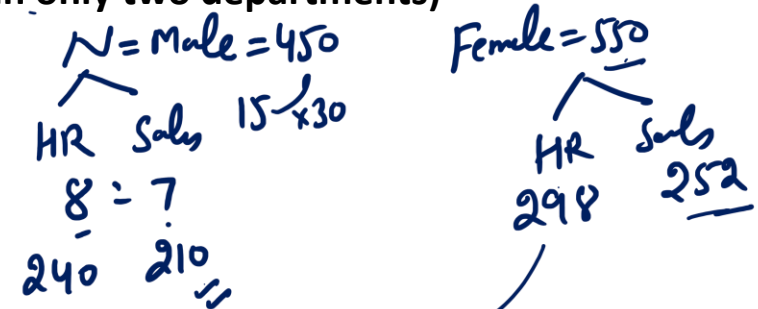
Q2. Find the total number of female employees in L is what percentage of total number of male employees in M ?

- A. 8.33%
- B. 66.67%
- C. 12.50%
- D. 33.33%
- E. 56.67%

$$\frac{170}{300} \times 100 = 56.66$$

Q3. Number of male employees in N work in two different departments, i.e., HR & Sales are in a ratio of 8:7 respectively. If number of female employees in N work in Sales 20% more than that of male employees working in the same department, then find the difference between number of male and female employees working in HR. (Total employees in N work in only two departments)

- A. 67
- B. 44
- C. 58
- D. 42
- E. 38



$$298 - 240 = 58$$



Q4. If $R = \sqrt{X + E + Z + 9}$, then find the value of $\frac{Y}{R}$

- A. 5.95
- B. 2.50
- C. 6.67
- D. 4.67
- E. 8.32

$$R = \sqrt{50 + 55 + 30 + 9} = \sqrt{144} = 12$$

$$\frac{80}{12} = \frac{20}{3}$$

Q5. In company K, '2E' number of males and '2.5X' number of females resign from the company, then find the total number of remaining employees in company K.

- A. 1550
- B. 1090
- C. 1175
- D. 1450
- E. 1265

Diagram showing Company K branching into Male (M) and Female (F).
 M: 300, F: 1200

$$R = 2 \times 55 = 110$$

$$R = 2.5 \times 50 = 125$$

$$\begin{array}{r} 1500 \\ - 235 \\ \hline 1265 \end{array}$$

Q6. Find the ratio of the average of Male employees from Company K, L, M & N to the average of Female employees from company K, L, M & N

- A. 151:165
- B. 161:173
- C. 173: 212
- D. 183:227
- E. 181:231

Home Work



Direction (7-10) : Study the following information carefully and answers the questions based on it.

In a Car Expo in the New Delhi, there are a total of 67,200 visitors who visited the car expo. The ratio of number of males to number of females who visited in the car expo is 9:7 respectively. All the visitors who visited the car expo, visits the six different car company pavilion namely Ford, Maruti, Volkswagen, Toyota, Honda and Nissan. Total number of visitors who visited Ford pavilion is 16,128 which is (P%) of the total number of visitors. Number of female visitors who visited Maruti pavilion is (Q%) of the total number of female visitors who visited car expo and 10,983 less than the total number of visitors who visited Ford pavilion. Number of male visitors who visited Honda pavilion is 15% of the total male visitors. Number of male visitors who visited Volkswagen pavilion is 1890 more than male visitors who visited Honda pavilion and is (R%) of the total number of male visitors who visited car expo. Number of male visitors who visited Maruti pavilion is 1/3rd of the number of female visitors who visited Maruti pavilion. Number of female visitors who visited Toyota pavilion is (7³) more than the number of male visitors who visited Maruti pavilion and is (S%) of the female visitors who visited Maruti pavilion. Number of female visitors who visited Nissan pavilion is 4410 which is (T%) of the total number of female visitors who visited car expo. Number of male visitors who visited Toyota pavilion is 3 times of the number of female visitors who visited same pavilion. Total number of visitors who visited Honda pavilion is 22% of total visitors. The ratio of male to female visitors who visited Nissan pavilion is 9:5 respectively.

Company	Male $\frac{37800}{9}$	Female $\frac{29400}{7}$	Total
Ford	8743	7385	16128 P=24
Maruti	1715	Q=17.5 5145	
Volkswagen	7560 R=20%	1288	
Toyota	6174	2058 S=40%	
Honda	5670	9114	14784
Nissan	7938	4410 T=15%	

$$\begin{array}{r} 37800 \\ 29057 \\ \hline 8743 \end{array}$$

$$\begin{array}{r} 29400 \\ 28112 \\ \hline 1288 \end{array}$$



Q.7) Find the value of P?

- a. 37
- b. 24
- c. 49
- d. 18
- e. None of these

Q.9) Find the value of S and T respectively?

- a. 17 and 20
- b. 51 and 27
- c. 32 and 22
- d. 40 and 15
- e. None of these

Q.8) Find the value of Q?

- a. 17.5
- b. 10.25
- c. 21
- d. 33.33
- e. None of these

Q.10) Find the value of $[(Q \times S \times T) - (P \times R \times T)]/100$?

- a. 23
- b. 17 (5/7)
- c. 33
- d. 16 (2/3)
- e. None of these

$$\frac{17.5 \times 40 \times 15 - 24 \times 15 \times 20}{100} = \frac{3 \times 11}{100} = 33$$



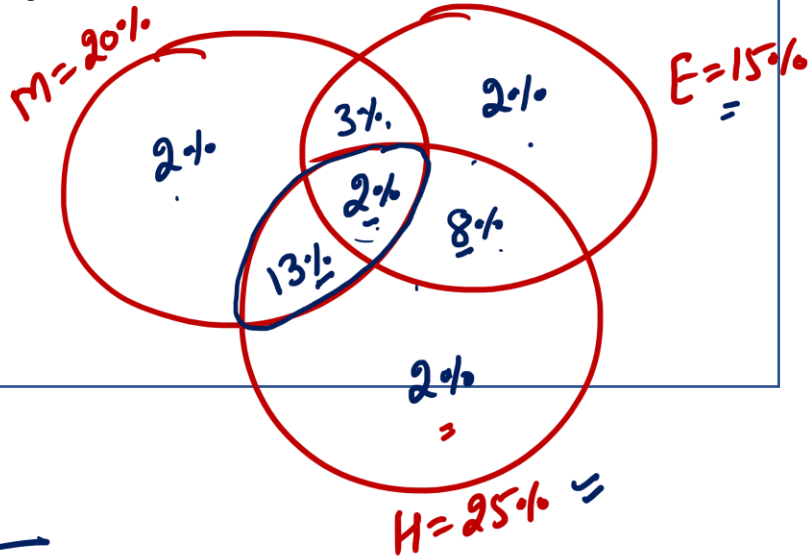
Q11. In an examination 20% of the students failed in math, 15% of the students failed in English, 25% of the students failed in hindi. If 5% of the students failed in math and English, 10% of the students failed in English and hindi, 15% of the students failed in math and hindi and 2% fail in all the three subjects math ,English and hindi. Then find the percentage of students passed in all the three subjects is ?

- 1) 18%
- 2) 32%
- 3) 40%
- 4) 68%
- 5) 32%

$M = 20\%$
 $E = 15\%$
 $H = 25\%$
 $M + E = 5\%$
 $E + H = 10\%$
 $M + H = 15\%$
 $M + H + E = 2\%$

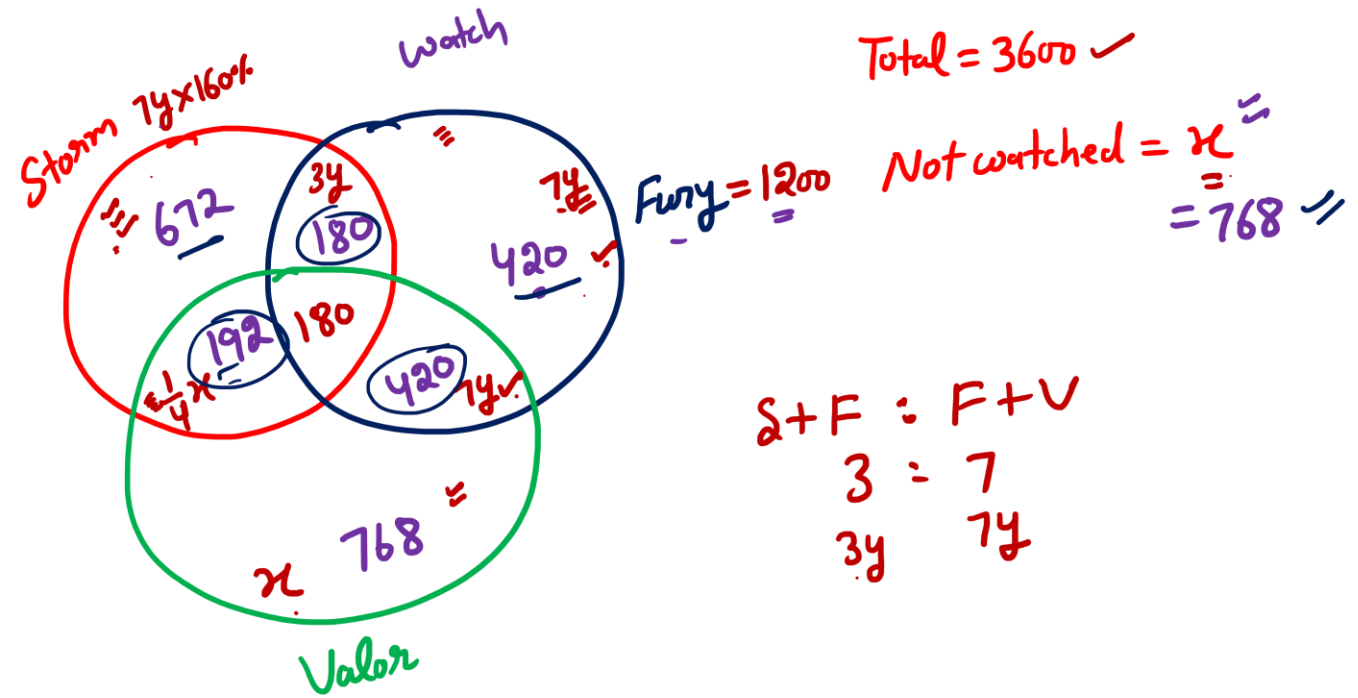
= ✓ only M = 2% ✓
 = ✓ only E = 2% ✓
 = ✓ only H = 2% ✓
 = ✓ only M + E = 3% ✓
 = ✓ only E + H = 8% ✓
 = ✓ only M + H = 13% ✓
 = ✓ M + H + E = 2% ✓

$100\% - 32\% = 68\%$




I.12-16) Study the following data carefully and answer the questions:

A town has 3600 people. Some of them watched the movies "Storm", "Fury", and "Valor" on Sunday, while some did not watch any movie. The number of people who did not watch any movie is the same as those who watched only "Valor". The total number of people who watched "Fury" is 1200. The number of people who watched all three movies is 5% of the total population. The number of people who watched only "Fury" is equal to the number of people who watched "Fury" and "Valor" only. The ratio of people who watched "Storm" and "Fury" only to "Fury" and "Valor" only is 3:7. The number of people who watched "Storm" and "Valor" only is $\frac{1}{4}$ of those who watched only "Valor". The number of people who watched only "Storm" is 60% more than those who watched only "Fury".



$$[672 + 180 + 180 + \frac{1}{4}x + x + 420 + 420] + [x] = 3600$$

$$2\frac{1}{4}x = 3600 - 1872$$

$$= 1728$$

$$x = 1728 \times \frac{4}{9} = 192 \times 4$$

$$= 768$$



Q.12) How many people watched at least one movie?

- [1] 2500
- [2] 2832
- [3] 2780
- [4] 2920
- [5] 2050

$$\begin{array}{r} 3600 \\ -768 \\ \hline 2832 \end{array}$$

Q.13) What is the ratio of people who watched only "Storm" to those who watched only "Fury"?

- [1] 3:2
- [2] 5:4
- [3] 7:3
- [4] 2:1
- [5] 8:5

$$\begin{array}{r} 672 : 420 \\ 168 : 105 \\ 56 : 35 \\ 8 : 5 \end{array}$$

Q.14) How many people watched exactly two movies?

- [1] 650
- [2] 559
- [3] 792
- [4] 779
- [5] 678

Q.15) What percentage of the total population did not watch any movie?

- [1] 21.33
- [2] 25.53
- [3] 24.62
- [4] 29.75
- [5] 27.42

$$\frac{128 \quad 64}{768} \times 100 = \underline{\underline{21.33}}$$

63 21.33



Q.16) How many people watched "Storm" but not "Valor"?

[1] 900

[2] 852

[3] 865

[4] 795

[5] 840

Home Work



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Q.17) Maya's monthly salary is 60% more than that of Swevi. Both Swevi and Maya, out of their respective monthly salary, pay equal sum towards EMI. Out of remaining monthly salary, Maya and Swevi, spend a certain amount towards house rent. Amount that Swevi pays towards EMI is 20% of her monthly salary. Amount that Maya pays towards house rent is 'x' times of that she pays towards EMI.

I: Find the total savings of Maya if her expenditure on EMI and house rent is just half of total salary. Also, EMI expense of Swevi is Rs 30000. It is to be assumed that Maya and Swevi had only two expenses from their salaries i.e. EMI and house rent.

II: Difference between house rents paid by Maya and Swevi is Rs 10000. House rent paid by Maya is Rs 6000 more than EMI paid by her. If house rent paid by Swevi is 33.33% of EMI paid by Maya, then, salary of Maya is?

- [a] Rs. 30000, Rs. 36000
- [b] Rs. 45000, Rs. 60000
- [c] Rs. 120000, Rs. 48000
- [d] Rs. 75000, Rs. 48000
- [e] Rs. 135000, Rs. 60000

	Maya	Swevi	①
Monthly	800 ✓	500 ✓	$100 + 100x = 800 \times \frac{1}{2}$
EMI	100 ✓	100 - 30000	$= 400$
		1 = 300	$100x = 300$
HR	100x		$x = 3$
	300 ✓		
			Salary = 400×300
			<u>$= 120000$</u>



Q18. 8% of the voters in an election did not cast their votes. In the election there were only two candidates. The winner by obtaining 48% of the total votes defeated his contestant by 1100 votes. The total number of voters in election was:

- 1) 21000
- 2) 22000
- 3) 23500
- 4) 27500
- 5) 32500

$\Rightarrow \text{Total} = 100x$
 $\Rightarrow \text{Polled} = 92x$
 $\Rightarrow \text{Valid} = 92x$

$\rightarrow NP = 8x$

$100x \times 275 = 8x \times 275$
 $\Rightarrow 100 \times 275 = 27500$

$92x \times 275$

$48x$ (W)

$92x - 48x = 44x$ (L)

$44x \times 275$

$48x \times 275$

$4x = 1100$
 $x = 275$



Q19. Two candidates participated in an election. 20% voters did not cast their votes, out of which 600 votes declared invalid and the winner gets 75% of valid votes and wins by 1500 votes. Find the number of voters in the voting list.

- 1) 3500
- 2) 4500
- 3) 5500
- 4) 6500
- 5) 7200

BASIC
DI
Venn diagram
Voters

Practical

$$\text{Total} = 100x \quad \left. \begin{array}{l} \\ \end{array} \right\} 20\% = NP = 20x$$

$$\text{Poller} = 80x$$

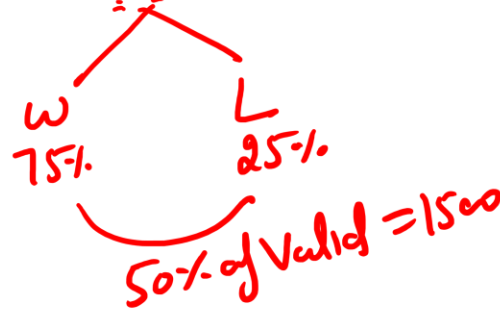
$$\text{Invalid} = 600$$

$$\text{Valid} = 80x - 600$$

$$40x - 300 = 1500$$

$$x = \frac{1800}{40} = 45$$

$$100x = \underline{4500}$$



Q20. Quantity I: If numerator of a fraction is increased by 25% and denominator of the fraction is increased by 20%, the fraction becomes 5/6. Find the original fraction.

Quantity II: If numerator of a fraction is decreased by 15% and denominator of the fraction is decreased by 10%, the fraction becomes 17/24. Find 80% of the original fraction.

Quantity III: If numerator of a fraction is increased by 10% and denominator of the fraction is decreased by 10%, the fraction becomes 11/10. Find 1/3rd of the original fraction.

- a) <, =
- b) =, =
- c) ≤, ≥
- d) < >
- e) >, >

$$\frac{x \times 125\%}{y \times 120\%} = \frac{5}{6}$$

$$\frac{x}{y} = \frac{4}{5} = .8$$

$$(ii) \frac{x \times 85\%}{y \times 90\%} = \frac{17}{24}$$

$$\frac{x}{y} = \frac{3}{4} \times \frac{80}{100} = .6$$

$$(iii) \frac{x \times 110\%}{y \times 90\%} = \frac{11}{10}$$

$$\frac{x}{y} = \frac{9}{10} \times \frac{1}{.9} = .3$$

$$.8 > .6 > .3$$



Q21. If the numerator of a fraction is increased by 250% and denominator of the fraction is increased by _____% the fraction becomes $\frac{2}{3}$. The original fraction is _____.

Which of the following options satisfy the given condition?

- a) 300, $\frac{5}{6}$
- b) 150, $\frac{4}{5}$
- c) 100, $\frac{3}{4}$
- d) 200, $\frac{4}{7}$
- e) None of these

Home Work



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Q22. Meena got 420 marks in an exam which is 20% less than the passing marks. Teena got _____ marks which is 60% of the total marks in the examination. Passing marks is _____% of the total marks in the examination. Which of the following options satisfy the given condition?

- I. 750, 40
- II. 600, 30
- III. 900, 48
- A. Both I and II
- B. Both II and III
- C. Both I and III
- D. All I, II and III
- E. Only III

How to solve



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Thank You

✓ ① Homework
6, 16, 21, 22 → Comment

✓ ② Comment → Lecture

For More Info Contact us: ③ Practice



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RBI Grade A/B 2025

QRE 360° ✓✓

Quant ✓✓

Topic – Ratio

M.T – Quant
T.F – Eng
W.S – Pen

Percentage → ① ✓
 → ② ✓



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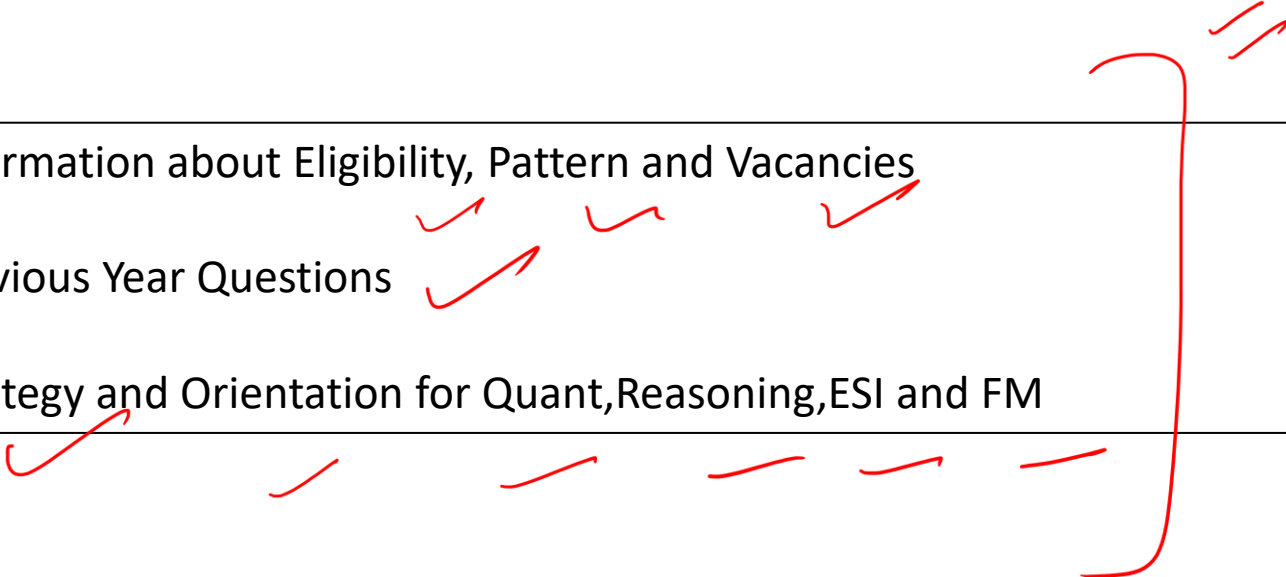


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Free Course

1. Information about Eligibility, Pattern and Vacancies
 2. Previous Year Questions
 3. Strategy and Orientation for Quant, Reasoning, ESI and FM
- 

Ratio & Proportion

↓
Comparison

↓
Equality

Extremes
 $a:b :: c:d$
Means

:

::

① Mean Prop.
a, b

Mean = $\sqrt{a \times b}$

4, 9

mean = $\sqrt{4 \times 9}$
= 6

② Third Prop.
a, b

Third = $\frac{b^2}{a}$

4, 9

$\frac{9^2}{4} = \frac{81}{4}$

③ Fourth Prop.
a, b, c

Fourth = $\frac{b \times c}{a}$

4, 6, 8

Fourth = $\frac{6 \times 8}{4} = 12$

Notes

↓
Concepts



Basic Points to remember

$$A = 30 \text{ ₹}$$
$$B = 50 \text{ ₹} \quad \checkmark = 50 \times 90 = 4500$$

$$A \quad B$$
$$30 : 50 \quad \checkmark$$
$$30 : 4500 \quad \checkmark$$

$$\frac{16}{20} = \frac{4}{5} \quad \checkmark$$

$$\frac{4}{5} = \frac{4}{5} \quad \checkmark$$

A	B
2	3

Ratio

- ① Comparison (Same Unit)
- ② Lowest fraction
- ③ Ratio always represent its initial value.
- ④ We can multiply/divide ratio by same no. There is no impact in the Ratio
- ⑤ We can not add/sub ratio by same no.

A	B
2	3
200	300
4	6
4000	6000

A	B
2	3
4	5
1	2

 X



Formation of Ratio

① Common element should be equal ✓ =

~~A : B~~

$A : B$ $B : C$

$(2 : 3) \times 4$ $(4 : 5) \times 3$

$8 : 12$ $12 : 15$

$A : B : C = ?$

8 12 15

Z

A	B	C
2	3	3
4	4	5
8 = 12 = 15		

<p>$A : B$</p> <p>$\frac{2}{3} \times \frac{3}{4}$</p> <p>$(8 : 9) \times 3$</p> <p>$8 = 9$</p>	<p>$B : C$</p> <p>$\frac{1}{2} \times \frac{2}{3}$</p> <p>$(3 : 4) \times 9$</p> <p>$9 = 12$</p>						
<table> <thead> <tr> <th>A</th> <th>B</th> <th>C</th> </tr> </thead> <tbody> <tr> <td>8</td> <td>9</td> <td>12</td> </tr> </tbody> </table>	A	B	C	8	9	12	
A	B	C					
8	9	12					



Equality

$$A = \frac{1}{2} B \quad B = \frac{2}{3} C$$

$$\frac{A}{B} = \frac{1}{2} \quad \frac{B}{C} = \frac{2}{3}$$

A	B	C
1	2	3

✓

✓

$$\frac{2A}{x} = \frac{3B}{x} = \frac{4C}{x} = 5D$$

A	B	C	D
$\frac{2}{3 \times 4 \times 5}$	$\frac{3}{2 \times 4 \times 5}$	$\frac{4}{2 \times 3 \times 5}$	$\frac{5}{2 \times 3 \times 4}$
60 =	40 =	30 =	24
30 =	20 =	15 =	12



Fracten

$$\begin{array}{ccc} A & B & B=C \\ \frac{1}{2} \times \frac{2}{3} & & \frac{1}{4} \times \frac{1}{5} \\ (3=4) \times 5 & & (5=4) \times 4 \\ 15=20 & & 20=16 \end{array}$$

$$\begin{array}{ccc} A & B & C \\ 15 & 20 & 16 \end{array}$$

$$\begin{array}{ccc} A & B & C \\ \frac{1}{2} & = & \frac{2}{3} & = & \frac{5}{6} \\ \frac{1}{2} \times 6 & = & \frac{2}{3} \times 6 & = & \frac{5}{6} \times 6 \\ 3 & = & 4 & = & 5 \end{array}$$

LCM of deno.



Directions Table given below shows total number of people (Adult + Children) visited four different parks in a week. The table also shows total number of males and ratio of male to female in adult people. Read the data carefully and answer the questions.

Parks	Total People (Adult + Children)	Total Number of Males	The ratio of total number of Males to that of Females in adult People
L	2200	80P	---
M	1440	40P	---
N	1200	45P	9:4
O	480	15P	5:3

child

Male

$\frac{4}{9} \times 675 = 300$
 $\frac{3}{8} \times 225 = 84.375$
 $\frac{45}{8} \times 225 = 1265.625$

Note: (i) Adult = Male + female

(ii) Total number of adult males visited all four parks in the week = 2700

$180P = 2700$
 $P = 15$



Q1. If total females visited park L are 255 more than that of total children visited park N, then find total children visited park L.

- A. 520
- B. 480
- C. 720
- D. 420
- E. 620

(L) $\begin{array}{r} 220 \\ 120 \\ \hline 340 \end{array}$ $\begin{array}{r} 225 \\ 255 \\ \hline 480 \end{array}$ C $\begin{array}{r} 520 \\ 40 \\ \hline 560 \end{array}$

Q3. Find the ratio of total female visited park O to total children visited park N and O together in a week.

- A. 9:22
- B. 9:23
- C. 9:25
- D. 3:7
- E. 9:31

$125:345$
 $27:69$
 $9:23$

Q2. Total female visited park M are $\frac{400}{3}\%$ more than total children visited park O, then find total children visited park M are what percent more than total female visited park N.

- A. 86.66%
- B. 84.66%
- C. 88.66%
- D. 82.66%
- E. 90.66%

(M) $\begin{array}{r} 1440 \\ 880 \\ \hline 560 \end{array}$ $\begin{array}{r} 260 \\ 300 \times 100 \\ \hline 86.66\% \end{array}$

$\begin{array}{r} 120 + 120 \times \frac{4}{3} \\ \hline 280 \end{array}$

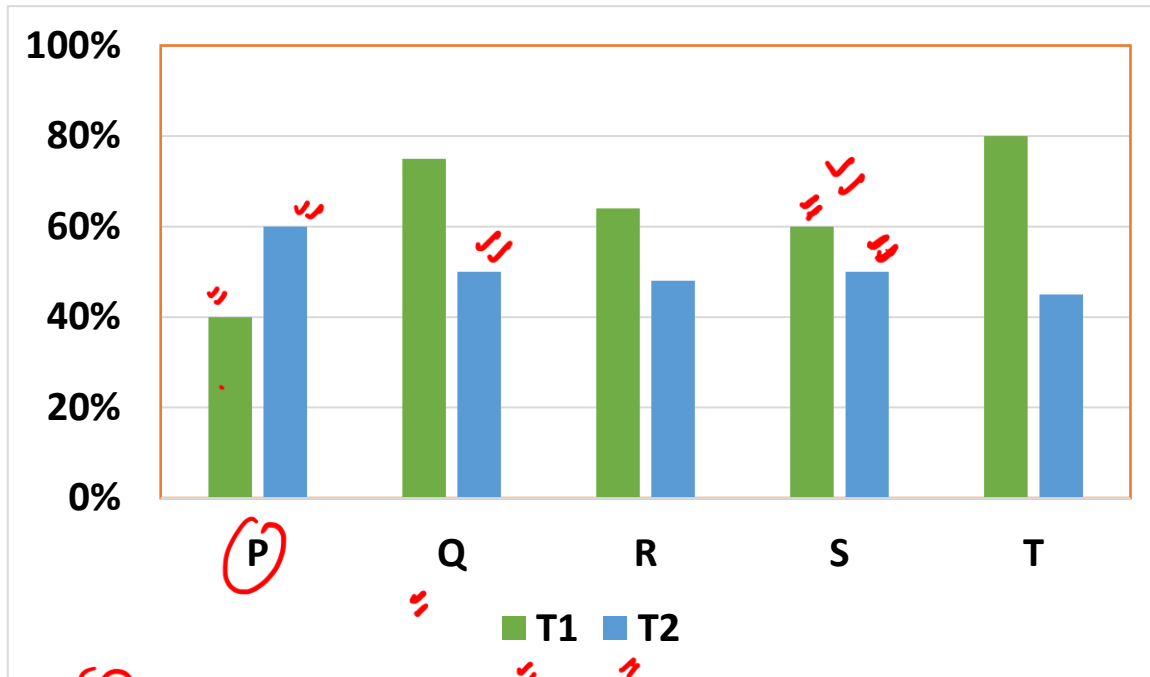
Q4. Find the difference between total male visited parks N & O together and total female visited in same parks.

- A. 525
- B. 435
- C. 565
- D. 465
- E. 555

900
 -435
 $\hline 465$



Read the following information carefully and answers the questions based on it. The bar graph given below shows the expenditure of five companies in two quarters (T1 and T2) of a year out of total income in these two quarters.



Q.5) If the income of each company for T2 is twice that of T1, if one seventh of the sum of savings of company S for both quarters is Rs. 13500. Find the savings of company Q in T2 if income of Q in T1 is 60% as that of company S in T1.

- [1] Rs. 40600
- [2] Rs. 42500
- [3] Rs. 40500
- [4] Rs. 42600
- [5] None of these

Handwritten notes for Q.5:

$T_2 = 2T_1$
 Income 2 = 1
 $\frac{200}{675} \times \frac{100}{675} =$

$67500 \times 60\% \times 2 \times 50\%$

$\frac{1}{7} (100 \times 40\% + 200 \times 50\%) = 13500$
 $(40 + 100) \times \frac{1}{7}$

2p unit = 13500
 1 unit = 675

$\frac{67500 \times 60}{100} \times \frac{2}{100} \times \frac{50}{100}$
 = 40500

Handwritten notes for Q.5:

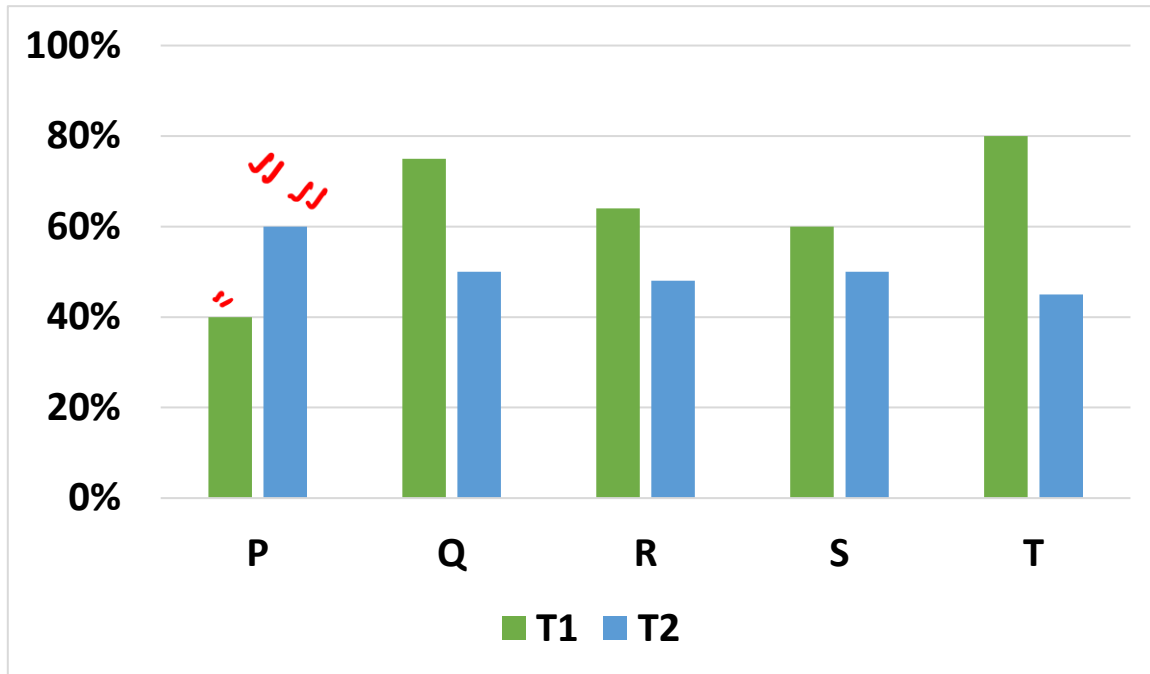
(P)
 T1 100
 T2 100
 Income 40
 Exp. 60
 Savg 40

Handwritten notes:

25 minutes
 300
 10-120



Read the following information carefully and answers the questions based on it. The bar graph given below shows the expenditure of five companies in two quarters (T1 and T2) of a year out of total income in these two quarters.



Q.6) For company P, if the income of P in T1 and T2 is in the ratio of 2:1 and Income of P in T2 is Rs. _____ and the difference between savings of T1 and T2 is _____. Find which of the following statement(s) is/are will satisfy the blanks in the same order.

- I. 25000, 20000 $5:4$
- II. 40000, 32000 $5:4$
- III. 72000, 57600 $5:4$

- [1] I only
- [2] III only
- [3] I and II only
- [4] II and III only
- [5] None of these

	T ₁	T ₂
Income	200	100
Exp	80	60
Saving	120	40
		80

$P(T_2) \text{ Income} : \text{Savings diff}(T_1 \text{ and } T_2)$
 $100 : 80$
 $5 : 4$



Q7. In a mixture of milk and water, the quantity of water is 40% less than the quantity of milk. When 5 liters of pure milk were added then the quantity of milk becomes 80% more than the quantity of water.

Quantity I: what is the quantity of water in the mixture?

Quantity II: 27 liters.

- A. Quantity I > Quantity II
- B. Quantity I \geq Quantity II
- C. Quantity II > Quantity I
- D. Quantity II \geq Quantity I
- E. Quantity I = Quantity II or Relation cannot be established.

Handwritten solution:

M W
 $100x$ $60x$
 $5x = 3x$
 $+5$

 $180 = 100$
 $9 = 5$

$3 \times 12.5 = 37.5$

Handwritten solution:

$$\frac{5x+5}{3x} = \frac{9}{5}$$

$$25x+25 = 27x$$

$$2x = 25$$

$$x = 12.5$$



Q8. A _____ litres mixture contains milk and water in the ratio 7:5 respectively. The milkman sold 48 litres of the mixture and added 12 litres of milk and 10 litres of water to the remaining mixture. The milkman again sold _____ litres of the mixture and added six litres of milk in the remaining mixture. The final mixture contains milk to water in the ratio is 5:3.

Which of the following satisfies the two blanks given in the questions?

- I. 96 litres, 28 litres
- II. 216 litres, 38 litres ~~x~~
- III. 144 litres, 59 litres
- a) Only I
- b) Only II ~~x~~
- c) Only III ~~x~~
- d) Only I and II
- e) Only II and III ~~x~~

① $96 = 12$ -48 litres

m	w
7	5
56	40
-28	-20
<hr/>	
28	20

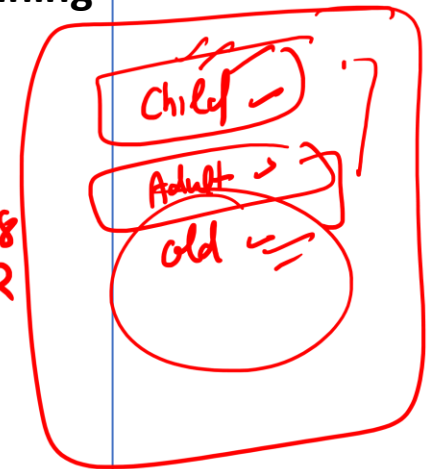
+12	+10	
m	w	
40	30	
4 = 3	1 = 4	
-16	-12	
<hr/>		
24	18	
+6		
<hr/>		
30	18	

$30 = 18 = 5 = 3$

216	18	
m	w	
7 = 5		
126	90	
-28	-20	
<hr/>		
98	70	
+12	+10	
<hr/>		
110	80	
-22	-16	
<hr/>		
88	64	
+6		
<hr/>		
94	64	

$19 = 38$
 $1 = 2$

m w
11 = 8
x2 x2



Q9. Ratio of the number of boys and girls in the class A is 4:5. The difference between the boys and girls in the class A is ----- and the total number of students in class B is 180. If the number of boys in B is 16 more than the number of boys in A, then the total number of girls in B is -----.

- i) 21, 80 ✓
- ii) 20, 84 ✓
- iii) 26, 60 ✓
- A. Only i and ii
- ~~B. All i, ii and iii~~
- C. Only i
- D. Only i and iii
- E. None of these

(A)

$$B = 9$$

$$4 = 5$$

$$1 = 0$$

$$1 = 21$$

$$4 = 84$$

$$1 = 20$$

$$4 = 80$$

$$1 = 26$$

$$4 = 104$$

(B)

Total	Boys	Girls
180	A+16	?
≠	84+16	80
	100	84
	80+16	60
	96	
	104+16	
	120	



Q10. Income of Raju and Suresh are in the ratio 27 :22 and ratio of their expenditure is 5:4 respectively. Raju saves Rs._____ and Suresh save Rs._____. Mahesh spends 50% of his income for rent, food and medicine. Amount he spent for medicine is Rs.4000 which is two-ninth of the remaining income. Income of Raju is 75% of Mahesh's income. Which of the following satisfies the two blanks given in the questions?

I. Rs.2000, Rs.2000

II. Rs.3000, Rs.2800

III. Rs.7000, Rs.6000

a) Only I

b) Only II

c) Only III

d) Both I and II

e) All I, II and III

Home Work



Comment



Reply



The following Table DI shows the quantity of waste (Dry and Wet) picked by a truck on 5 different days. The capacity of the truck from Monday to Wednesday is 180 kg and for rest two days is 150 kg

Day	Quantity of wet waste	Ratio of wet to dry waste	Difference between dry and wet waste (Wet > Dry)
Monday	- 100	5:4 80	20 kg
Tuesday	110 kg	-	22 kg
Wednesday	99 kg	9:7	-
Thursday	84 kg	7:y	24 kg
Friday	-	12:7	40 kg

Q.11) What is the value of 'y'?

- [1] 4
- ~~[2] 5~~
- [3] 6
- [4] 3
- [5] 8

Note:- If the waste produce in a day is greater than the capacity of the truck, then the extra amount of waste will be picked on next day.

$$\begin{aligned}
 W &= D \\
 7 &= y \\
 \downarrow & \\
 \times 12 & \quad \downarrow \quad \times 12 \\
 84 & \quad \quad \quad 60 \\
 \end{aligned}$$

$W > D$
 $= 24 \text{ kg}$
 $y \times 12 = 60$
 $= 5$



The following Table DI shows the quantity of waste (Dry and Wet) picked by a truck on 5 different days. The capacity of the truck from Monday to Wednesday is 180 kg and for rest two days is 150 kg

Day	Quantity of wet waste	Ratio of wet to dry waste	Difference between dry and wet waste (Wet > Dry)
Monday ✓	-	5:4	20 kg
Tuesday ✓	110 kg	-	22 kg
Wednesday	99 kg	9:7	-
Thursday	84 kg	7:7	24 kg
Friday ✓	-	12:7	40 kg

Note:- If the waste produce in a day is greater than the capacity of the truck, then the extra amount of waste will be picked on next day.

Q.12) Find the ratio of total dry waste produced on Monday, Tuesday and Friday together to wet waste produced on Wednesday and Thursday together?

- [1] 194 : 218
- [2] 185 : 212
- [3] 183 : 224
- [4] 212 : 185
- [5] 224 : 183

$5 = 40 \quad 12 = 8$
 $M = 80$
 $T = 88$
 $F = 56$
 $\frac{224}{224} = 183$



The following Table DI shows the quantity of waste (Dry and Wet) picked by a truck on 5 different days. The capacity of the truck from Monday to Wednesday is 180 kg and for rest two days is 150 kg

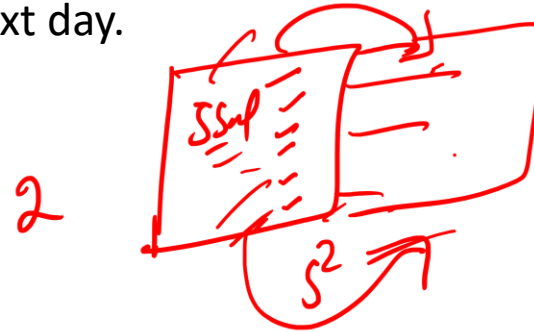
Day	Quantity of wet waste	Ratio of wet to dry waste	Difference between dry and wet waste (Wet > Dry)
Monday	-	5:4	20 kg
Tuesday	110 kg	-	22 kg
Wednesday	99 kg	9:7	-
Thursday	84 kg	7:5	24 kg
Friday	-	12:7	40 kg

Q.13) Find the total quantity of dry waste on all the five days together?

- [1] 381 kg
- ~~[2] 413 kg~~
- ~~[3] 361 kg~~
- [4] 337 kg
- [5] 321 kg

Note:- If the waste produce in a day is greater than the capacity of the truck, then the extra amount of waste will be picked on next day.

M 80
 T 88
 W 77
 T 60
 F = 56
 361



The following Table DI shows the quantity of waste (Dry and Wet) picked by a truck on 5 different days. The capacity of the truck from Monday to Wednesday is 180 kg and for rest two days is 150 kg

Day	Quantity of wet waste	Ratio of wet to dry waste	Difference between dry and wet waste (Wet > Dry)
Monday	-	5:4	20 kg
Tuesday	110 kg	-	22 kg
Wednesday	99 kg	9:7	-
Thursday	84 kg	7:5	24 kg
Friday	-	12:7	40 kg

Wet 99 Dry 77

$$180 \times 80\% = 144 \text{ kg}$$

Wet = 99
Dry = 45
54

$$144 - 99 = 45 \text{ kg}$$

Note:- If the waste produce in a day is greater than the capacity of the truck, then the extra amount of waste will be picked on next day.

Q.14) If on Wednesday the truck picks only 80% of the waste of his capacity, then find the difference between the quantity picked of wet waste and dry waste on the same day? (priority given to wet waste)

- [1] 64 kg
- [2] 48 kg
- [3] 62 kg
- [4] 54 kg
- [5] 42 kg



Direction (15-19): Read the following information carefully and answer the questions.

A certain number of people buy Pens and Pencils in four different shops namely A, B, C and D. The ratio of the number of Pens sold in shop D to shop A is 9:13 and the ratio of the number of Pencils sold in shop D to shop A is 8:13. The number of Pencils sold in shop B is 30 more than the number of Pens sold in shop A and the ratio of the number of Pencils to Pens sold in shop B is 2:1. The total number of Pencils and Pens sold in shop A is 520 which is 190 more than that of shop D. The number of Pencils sold in shop C is 100% more than that of shop B. The ratio of the number of Pencils to Pens sold in shop C is 20:9.

	Pen	Pencil	Total
A	$13x$	$13y$	520
B	80	160	240
C	144	320	464
D	90	240	330

$$13x + 13y = 520$$

$$x + y = 40 \quad 9x + 8y = 330$$

$$9x + 9y = 360$$

$$9x + 8y = 330$$

$$y = 30$$

$$x = 10$$



Q.15) In shop D, the ratio of the number of Pens to Pencils sold to males is 1:2 and the ratio of the number of Pens to Pencils sold to females is 1:3. Find the number of Pencils sold to females in shop D.

- A. 30
- B. 120
- C. 60
- D. 150
- E. 180

Males: P/Pn 1:2
 n - $2n$
 Females: P/Pn 1:3
 y - $3y$ (3y)
 $3 \times 60 = 180$
 Pen = 90
 Penc = 240
 $2n + y = 180$
 $2n + 3y = 240$
 $y = 60$
 $n = 30$

Q.17) The number of Pencils sold in shop E is $\frac{1}{8}$ th less than that of shop B, and the number of Pens sold in shop D is 25% less than that of shop E. Find the total number of Pens and Pencils sold in shop E.

- A. 200
- B. 260
- C. 180
- D. 320
- E. 100

(E) Pencil = 140
 Pen = 120
260
 D: Pen 75 = 100
 E: Pen 3 = 4
 $\downarrow \times 3$ $\downarrow \times 30$
 90 120

Q.16) If the average number of Pencils sold in shops B and C is Q and the difference between the number of Pens sold in shops A and D is P, then find the value of $(3Q-2P)$.

- A. 560
- B. 450
- C. 640
- D. 480
- E. 360

$Q = 240$
 $P = 40$
 $3 \times 240 - 2 \times 40$
 $720 - 80$
 $= 640$



Direction (20): The question consists of three statements, I, II and III. You have to decide that data in which of the statements is sufficient enough to answer the question.

Q.20) There are five fruits in an urn, apples, pears, mangoes, bananas and oranges. 25% of apples, pears, mangoes, bananas is 20. Find the number of oranges.

Statement I: Difference between quantity of oranges and apples, taken in the same manner is 10.

Statement II: Ratio of apples and pears is 2:3, respectively. Average of mangoes and oranges is 25. Average of bananas and apples is 17.5.

Statement III: Ratio of quantity of mangoes, bananas and oranges is 6:5:4, respectively. Difference between pears and apples is 5, taken in the same order.

- a. The data in either statement II or III alone are sufficient to answer the question. ~~X~~
- b. The data in statement II alone are sufficient to answer the question. ~~X~~
- c. The data in either statement I and II or III and II are sufficient to answer the question.
- d. The data in statements I and III together are sufficient to answer the question.
- e. The data in neither statement I, II and III alone, are sufficient to answer the question.

$$A + P + M + B = 80$$

$$O = ?$$

$$\textcircled{1} O - A = 10$$

$$O = 10 + 2x$$

$$\begin{matrix} 10 + 10 \\ = 20 \end{matrix}$$

$\textcircled{1} + \textcircled{2}$

$$M + O + B + A = 85$$

$$A + M + B = 85 - O$$

$$85 - O = 80 - P$$

$$85 - 10 - 2x = 80 - 3x$$

$$+5 = +x$$

$$x = 5$$

$\textcircled{11}$

$$\begin{matrix} 10 & 15 \\ A = P & M + O = 50 \\ 2:3 & B + A = 35 \\ 2x & 3x & B = 25 \end{matrix}$$

$\textcircled{111}$

$$\begin{matrix} M & B & O & P - A = 5 \\ 6:5:4 & & & \\ \downarrow & \downarrow & \downarrow & \\ 6 & 5 & 4 & \\ +15 & & & \\ 25 & & & \\ A + P + M + B = 80 \\ A + M + B = 80 - P \end{matrix}$$



Directions (21-25): Study the following information carefully and answer the questions given below.

In a Science quiz, four candidates A, B, C and D appeared. The quiz consists of two rounds, 1st round carry 1 mark for each question and 2nd round carry 2 marks for each question. If a candidate gives the wrong answer then 0.5 marks are deducted. No mark is awarded for not attempting a question. A answered $(a + 9)$ questions in 2nd round, 'a' number of questions attempted in 1st round by A and $(a - 2)$ wrong answers given by A. The ratio of the wrong answer made by A and B is 2:3. Total marks scored by D is 11. The ratio of questions answered in 2nd round and 1st round by B is 2:1 and he scored a total of 20 marks. C scored 4 marks more in 2nd round than 1st round question except for marks deduction for wrong answers and the number of wrong answers given by C is equal to the sum of the number of wrong answers made by A and B. In 2nd round answered by D is 40% of questions answered by A in 2nd round and in 1st round questions answered by D is two times of the questions answered by B in 1st round. The number of wrong answers given by D is equal to the difference of the wrong questions answered by A and C. All the candidates have given wrong answers in 2nd round only. Questions attempted by D in 2nd round is equal to the number of wrong answers given by him.

	(1) 1st Round	(2) 2nd Round	wrong -0.5	Total
A	a (6) ✓	a+9 (15)	a-2 (4)	26
B	(7) ✓	(14)	(a-2) $\frac{3}{2}$ (6)	20
C		$\frac{2+4}{2}$ (4)	(a-2) $\frac{5}{2}$ (10)	
D	(14) ✓	(a+9) 40% (6)	(a-2) $\frac{3}{2}$ (6)	11

$14 = 14$
 $16 - 3 = 13$
 7
 6
 $11 \times 2 = 22$
 $4 \times 5 = -2$
 $\boxed{-3} =$



Q.21) Total marks scored by B is how much less than the total marks scored by A?

- A. 2
- B. 5
- C. 6
- D. 7
- E. 9

$$\begin{array}{r} 20 \\ + 26 \\ \hline 46 \end{array}$$

Q.22) Find the ratio of the total number of questions answered by B and that by D.

- A. 12:17
- B. 13:15
- C. 21:20
- D. 14:17
- E. 19:15

$$21:20$$

Q.23) Find the sum of the total number of questions answered by A, B and D in 1st round.

- A. 12
- B. 34
- C. 23
- D. 27
- E. 47

Q.24) Find the marks scored by C if the number of questions answered by him in first round is 22.

- A. 13
- B. 14
- C. 23
- D. 25
- E. 26

HW



Q.25) If the average number of questions answered by A, B, C and D in 2nd round is 12. Find the number of questions answered by C in 2nd round.

- A. 12
- B. 13
- C. 24
- D. 35
- E. 45

HW



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Partnership

Investment ✓
↓
Amount ✓
Principal -

Time
↓
Months ✓
Years ✓

Profit =

$Profit = Investment \times Time$

	A	B	C	
Invst	x	y	z	<u>Condition</u>
Time	a	b	c	

Profit $xxa : yxb : zxc$



Time Constant

Investment & Profit

$24n$ ✓ $2m$ ✓ $3n$ ✓

A B C

10000 20000 30000

I = 1 : 2 : 3

Profit 1 : 2 : 3

Ratio



Q1. A, B and C jointly thought of engaging themselves in a business venture. It was agreed that A would invest 6,500/- for 6 months, B, 8,400/- for 5 months and C, 10,000/- for 3 months. A want to be the working member for which, he was to receive 5% of the profits. The profit earned was 7,400/-. What is the share of B in the profit?

- A. 1,900/-
- B. 2,660/ ✓✓
- C. 2,800/-
- D. 2,840/-
- E. 2,900/-

	A	B	C
I	6500	8400	10000
T	6	5	3

7400 ✓
 $A = 5\%$
 $= 370$
 $7400 - 370 = 7030$

Profit

$6500 \times 6 = 39000$
 $8400 \times 5 = 42000$
 $10000 \times 3 = 30000$

$13 : 14 : 10$
 $13 : 14 : 10$

$\frac{14}{37} \times 7030 = 2660$

$\frac{13}{37} \times 7030 + 370$



Q2. Amit, Bharat and Chirag started a business with their investments in the ratio 1: 2: 4. After 6 months, Amit invested half the amount more than before; Bharat invested twice the amount more as before while Chirag withdrew 1/4th of his investment. What will be the ratio of their profits at the end of the year?

- A. 5: 16: 14 ✓
- B. 16: 5: 14
- C. 14: 5: 12
- D. 14: 12: 5
- E. None of these

Invt	A	B	C
	1	2	4
	$1 \times 6 =$	$2 \times 6 =$	$4 \times 6 =$
	$1.5 \times 6 =$	$6 \times 6 =$	$3 \times 6 =$
	15	48	42
	5	16	14

2025



Q3. A, B and C start a small business. A contributes ----% of the total capital invested in the business. B contributes as much as A and C together. Total profit at the end of the year is Rs.2600 and profit share of A is -----.

- a) 10%, Rs.120 ~~x~~
- b) 15%, Rs.360 ~~x~~
- c) 20%, Rs.520 ✓✓
- d) 25%, Rs.560
- e) None of these

Handwritten solution:

Total Profit = 2600

	50%	50%	
	A	B	C
Invest	—%	50%	50—%
	x%	50%	y%

$x = 50 = y$
 $x = 50 = y$

$A = \text{Invest} = \text{Profit}$
 $10\% = 10\% = 260$

✓ I x
 ✓ Profit x



Q.4) P, Q and R entered into a partnership by investing a certain amount for 12 months, T month and 12 - T months respectively. Find the value of T?

Statement I: Q invested 50% more amount than P and R invested twice the amount of Q.

Statement II: At the end of the partnership, the total profit earned by them is Rs. 700 and the profit share of Q is Rs. 100

Statement III: Profit share of P and R is in the ratio of 1:2

- A. Only I and II
- B. Only I and III
- C. Only II and III
- D. Either I and II or I and III
- E. None of these

Time

P	Q	R
12	T	12 - T
100	150	300
2	3	6

① I →

② Q Profit = $\frac{100}{700}$

③ P R
Profit 1 : 2

① + ②

$$\frac{3T}{24 + 3T + 72 - 6T} = \frac{100}{700}$$

$$21T = 3T + 96$$

$$18T = 96$$

$$T = 4$$

① + ③

$$\frac{12 \times 2}{(12 - T) \times 6} = \frac{1}{2}$$

$$48 = 72 - 6T$$

$$6T = 24$$

$$T = 4$$



Q5.

Quantity I: Rs. 13950 is divided among three persons A, B and C. B must get double the share of A and C must get Rs. 50 less than the A. Find the share of A.

Quantity II: A, B and C invest Rs. 47000 in a business. If A invests Rs. 7000 more than B and B invests Rs. 5000 more than C, then find C share out of the total profit of Rs. 14100.

- A. Quantity I > Quantity II
- B. Quantity I \geq Quantity II
- C. Quantity II > Quantity I
- D. Quantity II \geq Quantity I
- E. Quantity I = Quantity II or Relation cannot be established.

(i)

A	B	C
x	$2x$	$x-50$

$$4x - 50 = 13950$$

$$4x = 14000$$

$$x = 3500$$

$$3x + 2000 = 47000$$

$$3x = 45000$$

$$x = 15000$$

(ii)

A	B	C
$x+7000$	x	$x-5000$

I

I

P

$$\frac{x+7000}{22000} = \frac{x}{15000} = \frac{x-5000}{10000}$$

$$\frac{22}{22} = \frac{15}{15} = \frac{10}{10}$$

$$\frac{10}{47} \times 14100 = 3000$$



Q6. A is working and B is a sleeping partner in a business. A puts in Rs. 12000 and B Rs. 20000. A receives 10% of the profits for managing, the rest being divided in proportion to their capitals. Out of a total profit of Rs. 18000 the money received by A is :

- 1) Rs. 6480
- 2) Rs. 8400
- ~~3) Rs. 7875~~
- 4) Rs. 8325

Handwritten solution:

	A	B	
I	12000	20000	
	3	5	

$A = 10\%$
 \downarrow
 $= 1800$

90%
 18000

16200

$A = \frac{3}{8} \times 16200 + 1800$
 $= 6075 + 1800$
 $= 7875$



Q7. A, B and C entered into a partnership with investment in the ratio of _____. After one year, B doubled his investment. At the end of two years, they earned a profit of Rs. _____. The share of B is Rs. 18000. Which of the following option satisfies the given condition?

- I) 5 : 3 : 4, 54000 ✓
- II) 3 : 1 : 5, 114000 ✓
- III) 6 : 5 : 7, 49200 ✓
- a) Only I
- b) Only II
- c) Only I and II
- d) Only II and III
- ~~e) All I, II and III~~

A	B	C	
$5 \times 2 = 10$ ✓	$3 \times 1 = 3$ $6 \times 1 = 6$ (9) ✓	$4 \times 2 = 8$ ✓	$\frac{9}{27} = \frac{18000}{54000}$
$3 \times 2 = 6$ ✓	$1 \times 1 = 1$ $2 \times 1 = 2$ (3) ✓	$5 \times 2 = 10$	$\frac{3}{19} = \frac{18000}{114000}$
$6 \times 2 = 12$ ✓	$5 \times 1 = 5$ $10 \times 1 = 10$ (15) ✓	$7 \times 2 = 14$ ✓	$\frac{15}{42} = \frac{18000}{49200}$



Q.8) Harry, Ron and Cedrick started a business with an investment in the ratio of 14: 15: 20. After 5 months, Harry invested an additional amount which was $\frac{2}{5}$ th of the initial investment of Ron. 3 months after that, Ron increased his investment by an amount which was $\frac{1}{4}$ th of Cedrick's initial investment and Cedrick increased his investment by an amount which was $\frac{2}{3}$ rd of Ron's initial investment. After one year of business, the difference between the profit share of Ron and Harry was what percent of that between Ron and Cedrick?

- [1] 13.33%
- [2] 6.67%
- [3] 16.67%
- [4] 8.33%
- ~~[5] 12.5%~~

$$\frac{1}{8} \times 100 = 12.5\%$$

$$\frac{3}{15} + \frac{2}{5} = 6$$

H	:	R	:	C
14	:	15	:	20
$\frac{14 \times 5}{20 \times 7}$:	$\frac{15 \times 8}{20 \times 4}$:	$\frac{20 \times 8}{30 \times 4}$

$$21p = 20p = 28p$$

$$P \rightarrow 21 = 20 = 28$$



Q9. L and M started a business by investing amount in the ratio 6: 5 respectively. L invested Rs.4000 more than M. After P months, N joined them by investing Rs.16000 and L withdrew Q% of his investment. After next 6 months, M withdrew Rs. R and N added Rs.2000. At the end of 2 years partnership, the profit received by L, M and N is in the ratio 120: 110: 69 respectively.

Which of the following option is possible to fill the given blanks in same order?

- A. 8, 25, 4000
- B. 6, 20, 2000
- C. 8, 20, 6000
- D. 4, 25, 2000
- E. 6, 30, 4000

Handwritten solution:

$$\frac{L}{M} = \frac{6}{5} \Rightarrow L = 12000, M = 8000$$

$$L: 24000 \times P + (24000)(100-Q)\% \times 6$$

$$M: 2000 \times P + (2000 - R)(24 - 6 - P)$$

$$N: 16000 \times 6 + 18000 \times (24 - 6 - P)$$

$$(24000 \times P) + (24000)(100-Q)\%(24-P) : (2000)(P+6) + (2000-R)(18-P) : 18000 \times (18-P) + 96000$$

$$192000 + 24000 \times \frac{25}{100} \times 16 : 2000 \times 14 + 16000 \times 10 : 18000 \times 10 + 96000$$

$$480000 : 440000 : 276000$$

$$480 : 440 : 276$$

$$120 : 110 : 69$$



Direction (10-12): Study the given information carefully and answer the given questions.

Three friends – P, Q, and R have invested different sums in four businesses – A, B, C, and D. The sum invested by R in business D is Rs.'b'. Sum invested by Q in business D is 75% of the sum invested by R in business D which is $\frac{1}{9}$ th less than the sum invested by P in business D. Sum invested by Q in business C is Rs.'a'. Sum invested by P in business B is 20% more than the sum invested by Q in business C. The ratio of the sum invested by P in Business B to the sum invested by R in Business A is 6: 7. The Sum invested by P in Business A is $\frac{1}{3}$ rd more than the sum invested by R in Business D. The ratio of the sum invested by P, Q, and R in business A is 8 : 6 : 7 respectively. R invested 50% more sum in business C than Q invested in business C. The ratio of the sum invested by P and the sum invested by R in business C is 5: 6 respectively. R invested 33.33% less sum in business B than he invested in business C. Q invested Rs.6000 more in business B than R invested in business B. P, Q, and R together invested Rs.75000 in business C.

	P	Q	R
A	$\frac{4}{3} \times b = 1.6a$ 32000	1.2a 24000	1.4a 28000
B	$= 1.2a$ 24000	a+6000 26000	a 20000
C	1.25a 25000	a 20000	1.5a 30000
D	$\frac{9}{8}b$ 27000	$\frac{3}{4}b$ 18000	b 24000

$$1.25a + a + 1.5a = 75000$$

$$3.75a = 75000$$

$$a = \frac{75000}{3.75} \times 100$$

$$= 20000$$

$$\frac{4}{3}b = 32000$$

$$b = 24000$$



Q.10) In business C, R withdraws his sum after 8 months from the start of business. At the end of 1 year, the total profit is Rs.5681. Find the profit share of Q.

- a. 1576
- b. 1748
- c. 1864
- d. 1654
- e. None of these

Handwritten solution for Q.10:

P	Q	R
25000	20000	30000
5 × 12	4 × 12	6 × 2
60	48	12
5 : 4 : 1		
4/12 × 5681 = 1748		

Q.11) In business A, Q increases his investment by 25% after 6 months from the start of the business and after 3 more months, P withdraws his investment. At the end of 1 year, P got Rs.2472 as his profit share. Find the total profit at the end of 1 year.

- a. 6472
- b. 6792
- c. 7537
- d. 8137
- e. None of these

Homework

Q.12) In business D, 25% of the total profit is donated to charity and the rest of the profit is distributed among P, Q, and R as per their investment. P received Rs.3348 as his profit share. Find the total profit at the end of 1 year.

- a. 11408
- b. 9454
- c. 12658
- d. 10852
- e. None of these

Handwritten solution for Q.12:

P	Q	R
27000	18000	24000
9	6	8
9 : 6 : 8		

Handwritten notes for Q.12:

TP = 100
Ch = 25
75%

Handwritten calculation for Q.12:

$$\frac{9}{23} \times 75 = 3348$$

$$1 = \frac{3348 \times 23}{9 \times 75} \times 100 \times \frac{4}{100}$$

$$= 2852 \times 4$$

$$= 11408$$



Q.13) 'A' and 'B' started a business where 'B' invested Rs. 1,760 more than 'A'. 'B' invested for a time period that is 6 months less than the time period for which 'A' invested. Find the profit share of 'B'.
 Statement I: 'A' invested for total of 12 months and the total annual profit received from the business was Rs. 7,000.

Statement II: If 'B' had invested Rs. 440 less, then the profit share of 'A' would have been 20% more than that of 'B' while the total annual profit earned from the business was Rs. 7,000.

Statement III: The ratio of investment of 'A' and 'B' is 9:17, respectively. If 'B' had invested for 2 more months, then ratio of profit shares of 'A' to that of 'B' would be 27:34. Actual annual profit earned from the business was Rs. 7,000.

Statement IV: 'A' had invested Rs. 1,980 for 12 months. Profit share of 'A' was Rs. 200 more than that of 'B'.

A Only I and IV

B Only II and III

C Only III and IV

D Only IV

E Only I and III

I

A	B
x	$1760+x$
y	$y-6$

T

① $y=12$ TP=7000

② $1760+x-440$

③ $\frac{x}{1760+x} = \frac{9}{17}$ $A=y$ $\frac{27}{34}$ $TP=7000$
 $B=y-6+2$

$x - 17x = 9x = 1760 \times 9$ $\frac{1980 \times 4}{3740 \times y-4} = \frac{27}{34}$
 $x = \frac{1760 \times 9}{8}$ 1980



Q.14) Two friends A and B together started a business with initial investment of Rs. 'x' and Rs. 3200 respectively. After a year, A increased his investment by 25% while B reduced his investment by Rs. 800. Find the total profit earned by A and B together after 2 years.
Statement I: The ratio of profit share of A to B after 2 years is 27:28.

Statement II: The amount increased by A after one year is Rs. 600 and profit share of A is 170% more than the additional investment made by him.

Statement III: Profit earned by B after 2 years is Rs. 1680.

A Data in statement I alone are sufficient to answer the question while data in statement II and statement III together are necessary to answer the question.

B Data in statement II alone are sufficient to answer the question while data in statement I and statement III together are necessary to answer the question.

C Data in statement III alone are sufficient to answer the question while data in statement I and statement II together are necessary to answer the question.

D Data in either statement I or in statement II or statement III alone are not sufficient to answer the question

E None of these

✓ Home Work
Q 11
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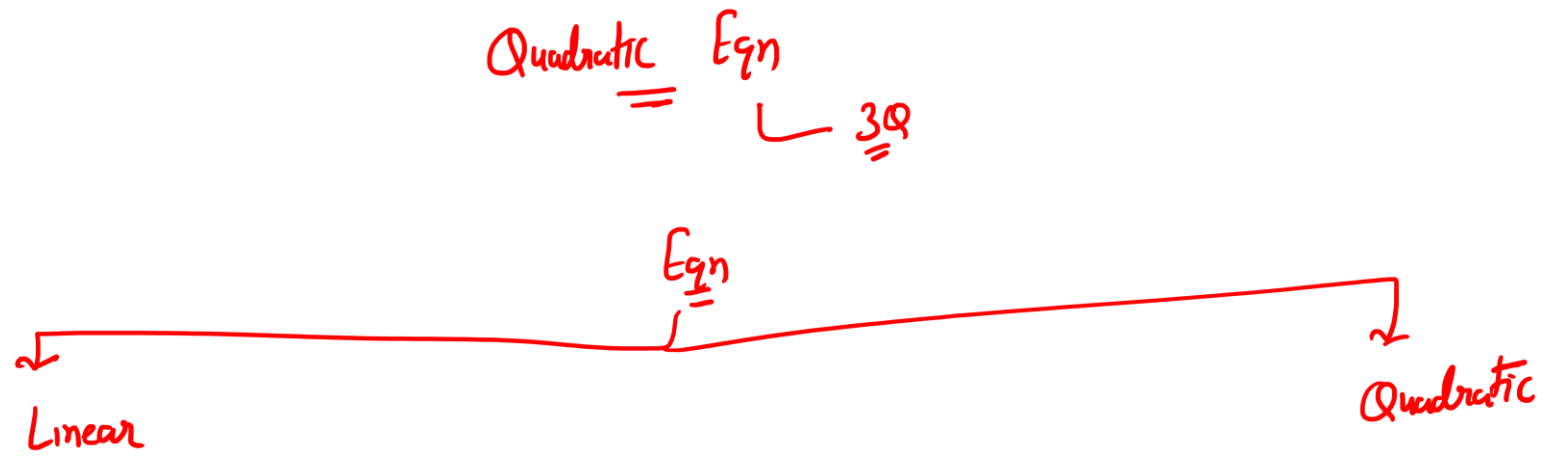
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- Nature of roots ✓✓

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Eqn

Linear

$$ax + by + c = 0$$

$$2x + 3y = 13$$

$$5x + 9y = 37$$

(1) $\times 5$
(2) $\times 2$

$$10x + 15y = 65$$

$$10x + 18y = 74$$

$$3y = 9$$

$$y = \frac{9}{3} = 3$$

$$x = 2 \quad \boxed{x < y}$$

$$y = 3$$

$$2x + 3(3) = 13$$

$$2x = 13 - 9 = 4$$

$$x = \frac{4}{2} = 2$$

Quadratic

$$ax^2 + bx + c = 0$$

Power = 2

a, b, c real No.

$$a \neq 0$$

(1) $x > y$

~~(2) $x < y$~~

(3) $x = y$

(4) No relation



How to find Roots:-

$$x^2 + 7x + 12 = 0$$

Basic

$$ax^2 + bx + c = 0$$

$$a=1 \\ b=7 \\ c=12$$

$$\text{Roots} = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$\frac{-7 \pm \sqrt{(7)^2 - 4 \times 1 \times 12}}{2 \times 1}$$

$$= \frac{-7 \pm 1}{2} = \frac{-7+1}{2}, \frac{-7-1}{2}$$
$$= \boxed{-3, -4}$$

$$ax^2 + bx + c = 0$$

α, β

$$\alpha + \beta = -\frac{b}{a}$$

$$\alpha \times \beta = \frac{c}{a}$$

Prove
↓
Next class



$$\underline{x^2} + \underline{7x} + \underline{12} = 0$$

α, β

- ① $\alpha + \beta = +7$ $\alpha\beta = 12 \times 1 = 12$
- ② $4, 3$ \downarrow
 $2 \times 2 \times 3$
- ③ $x = \frac{-4}{1}, \frac{-3}{1} =$



$$\begin{array}{r|l} 2 & 12 \\ \hline 2 & 6 \\ \hline & 3 \end{array}$$

$$y^2 - 8y + 20 = 0$$

- ① $\alpha + \beta = -8$ $\alpha\beta = -20$
- ② $-10, +2$
- ③ $y = \frac{10}{1}, \frac{-2}{1} = 10, -2$



Relation btwn Roots

① $x > y$

$x = 5, 7$ $y = 3, 4$

x y

$5 > 3$

$7 > 3$

$5 > 4$

$7 > 4$

③ $x \geq y$

$x = 5, 7$

$y = 4, 5$

x y

$5 > 4$

$7 > 4$

$5 = 5$

$7 > 5$

④ $x \leq y$

$x = 4, 5$

$y = 5, 7$

② $x < y$

$x = 3, 4$ $y = 5, 7$



(5) Equal, No relation can be established

$$x = 4, 4$$
$$y = 4, 4$$

< >
Opposite sign

$$x = 5, 10$$
$$y = 6, 12$$

x		y
5	<	6
10	>	6
5		12
10		12



① Eqn

② Roots = ?

③ Relats btwn Roots = ?



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Quadratic Equation

Firstly check

$$ax^2 + bx + c = 0$$

b	c	=	Nature of Roots	
+	+	=	-	-
-	+	=	+	+
+/-	-	=	+	-

✓
✓
✓

$x^2 + 7x + 10 = 0$ (-, -)

$y^2 - 8y + 12 = 0$ (+, +)

- ① $x > y$
- ~~② $x < y$~~
- ③ $x \geq y$
- ④ $x \leq y$
- ⑤ No relation

✓

Q1.

I. $x^2 + 7x + 12 = 0$ $(-1-)$ ✓

$\alpha + \beta = 7$ $\alpha\beta = 12$
3, 4

II. $y^2 + 5y + 6 = 0$ $(-1-)$ ✓

$x = -3, -4$ $x \quad y$

$-3 = -3$

$-4 < -3$

$-3 < -2$

$-4 < -2$

$x \leq y$

$\alpha + \beta = 5$ $\alpha\beta = 6$

3, 2

$y = -3, -2$

[1] $x > y$

[2] $x \leq y$

[3] $x \geq y$

[4] $x < y$

[5] $x = y$ or relationship between x and y can't be established

Q2.

I. $x^2 + 17x + 72 = 0$ *(- -)*

II. $6y^2 - 53y + 60 = 0$ *(+ +)*

[1] $x > y$

[2] $x \leq y$

[3] $x \geq y$

~~[4] $x < y$~~

[5] $x = y$ or relationship between x and y can't be established

$x < y$



Q3.

I. $5\sqrt{2}x^2 + x - 3\sqrt{2} = 0$ $+1- =$

II. $8y^2 + 10y - 7 = 0$ $+1- =$

[1] $x > y$

[2] $x \leq y$

[3] $x \geq y$

[4] $x < y$

[5] $x = y$ or ~~relationship~~ between x and y can't be established

x	y
+	+
-	+
+	-
-	-

$ax^2 + bx + c = 0$

$+1- =$

\ominus

$-x- = +$

$+x+ = +$

$+1x-$
 $- +$



Q4. Direction: Given question is followed by information given in two statement named as Quantity 1 and Quantity 2. You have to study the information along with the question and compare the value derived from Quantity 1 and Quantity 2 then answer the question.

Quantity 1: Find the value of x

$$(6x^2 + 17) - (3x^2 + 20) = 0$$

Quantity 2: Find the value of y

$$(5y^2 - 12) - (9y^2 - 16) = 0$$

A. Quantity 1 > Quantity 2

B. Quantity 1 \geq Quantity 2

C. Quantity 1 < Quantity 2

D. Quantity 1 \leq Quantity 2

E. ~~if~~ x = y or relationship cannot be established

$$\begin{aligned} 6x^2 + 17 - 3x^2 - 20 &= 0 \\ 3x^2 - 3 &= 0 \\ 3x^2 &= 3 \\ x^2 &= 1 \\ x &= +1, -1 \end{aligned}$$

$$\begin{aligned} 5y^2 - 12 - 9y^2 + 16 &= 0 \\ 4y^2 - 4 &= 0 \\ 4y^2 &= 4 \\ y^2 &= \frac{4}{4} = 1 \\ y &= +1, -1 \end{aligned}$$



Direction: Two equations (I) and (II) are given in each question. On the basis of these equations, you have to decide the relation between 'x' and 'y' and give answer.

Q5.

I. $x^2 + 53 = 150\%$ of 78

II. $y = \sqrt[3]{512}$

A. if $x > y$

B. if $x \geq y$

C. if $x < y$

~~D.~~ if $x \leq y$

E. if $x = y$ or relation cannot be established.

$y = 8$

$x^2 + 53 = 78 + 39$

$= 117 - 53$

$= 64$

$x = \pm 8, -8$

$x \leq y$



Given below are two equations. Based on the given information, you have to determine the relation between the two quantities. You should use the given data to choose among the possible answers.

Q.6) I : $x^2 + 5\sqrt{3}x - 42 = 0$

II : $y^2 - 8\sqrt{2}y + 30 = 0$

- [1] $x > y$
- ~~[2] $x < y$~~
- [3] $x \geq y$
- [4] $x \leq y$
- [5] $x = y$ or no relation can be established

$$x^2 + 5\sqrt{3}x - 42 = 0$$

$$\alpha + \beta = 5\sqrt{3} \quad \alpha\beta = -42$$

$$\alpha + \beta = 5 \quad \alpha\beta = \frac{-42}{3} = -14$$

$$7, -2$$

$$7\sqrt{3}, -2\sqrt{3}$$

$$x = -7\sqrt{3} + 2\sqrt{3}$$

$$x < y$$

$$2\sqrt{3} \\ 2 \times 1.73 \\ 3.46$$

$$3\sqrt{2} \\ 3 \times 1.41 \\ 4.2$$

$$y^2 - 8\sqrt{2}y + 30 = 0$$

$$\alpha + \beta = -8\sqrt{2} \quad \alpha\beta = 30$$

$$\alpha + \beta = -8 \quad \alpha\beta = 15$$

$$-5, -3$$

$$-5\sqrt{2}, -3\sqrt{2}$$

$$y = 5\sqrt{2} - 3\sqrt{2}$$



Q.7)

$$I : x^2 - 8\sqrt{2}x + 30 = 0$$

$$II : y^2 - 8\sqrt{3}y + 45 = 0$$

[1] $x < y$

[2] $x > y$

[3] $x \leq y$

[4] $x \geq y$

[5] $x = y$ or no relation can be established

Homework



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Q.8)

I : $6x^2 - (3+4\sqrt{3})x + 2\sqrt{3} = 0$

II : $3y^2 - (6+2\sqrt{3})y + 4\sqrt{3} = 0$

[1] $x < y$

[2] $x > y$

[3] $x \leq y$

[4] $x \geq y$

[5] $x = y$ or no relation can be established

$\alpha + \beta = -(3+4\sqrt{3}) \quad \alpha\beta = 2\sqrt{3} \times 6$

$-3, -4\sqrt{3}$
 $x = \frac{3 \pm 4\sqrt{3}}{6}$
 $= \frac{1}{2}, \frac{2}{\sqrt{3}}$

$\alpha + \beta = -(6+2\sqrt{3}) \quad \alpha\beta = 4\sqrt{3} \times 3$

$-6, -2\sqrt{3}$
 $y = \frac{6 \pm 2\sqrt{3}}{6}$
 $= 2, \frac{2}{\sqrt{3}}$

$x = \frac{1}{2} < 2$

$\frac{2}{\sqrt{3}} < 2$

~~$\sqrt{3} \frac{1}{2} < \frac{2}{\sqrt{3}} \quad 4$~~

~~$\frac{2}{\sqrt{3}} = \frac{2}{\sqrt{3}}$~~

$x \leq y$



Q.9)

$$I : 8x^2 + (4+2\sqrt{2})x + \sqrt{2} = 0 \quad (-1-)$$

$$II : y^2 - (3+\sqrt{3})y + 3\sqrt{3} = 0 \quad (+1+)$$

[1] $x < y$

[2] $x > y$

[3] $x \leq y$

[4] $x \geq y$

[5] $x = y$ or no relation can be established

$x < y$



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Q10. Select the correct match given in the options.

Equations	Conditions
a). $8x^2 - 78x + 169 = 0$ <i>(+ +)</i>	d). Difference of roots is 7
b). $2x^2 + 11x + 14 = 0$ <i>(- -)</i>	e). Product of both root value is negative
c). $X^2 - 19x + 78 = 0$ <i>(+ +)</i>	f). Both roots are negative values

A. a-f, a-e ~~X~~

B. c-d, b-e, a-f ~~X~~

~~C. c-d, b-f~~

D. c-f, a-d ~~X~~

E. b-d, c-f ~~X~~



Q11. Select the correct match given in the options.

Equations	Conditions
a). $4y^2 + 11y + 6 = 0$ <i>-1</i>	d). Both roots are negative <i>- .</i>
b). $y^2 - 9y + 20 = 0$ <i>4, 5</i> <i>+1+</i>	e). Sum of roots is <u>perfect square</u>
c). $y^2 - 8y + 15 = 0$ <i>+1+</i>	f). Both <u>root values</u> are positive

A. b-e

B. b-f, a-e, c-d ~~X~~

C. c-f

~~D. a-d, b-e, c-f~~

E. c-e



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Q.12) The following equation must satisfy the condition : ($y < x$)

Match the column accordingly

$x > y$

Column - I	Column - II
A) $x^2 + 21x + 108 = 0$ $-1 - =$	D) $y^2 + 27y + 180 = 0$ $-1 - =$
B) $x^2 - 3x - 28 = 0$ $+1 - =$	E) $y^2 - 42y + 440 = 0$ $+1 + =$
C) $x^2 - 28x + 171 = 0$ $+1 + =$	F) $y^2 - 2y - 35 = 0$ $+1 - =$

A (-1-) [D] E^X F^X

[1] C-D, C-F ✓

[2] A-F, A-E, B-E ✗

[3] Only A-E ✗

[4] A-E, C-E ✗

[5] A-D, B-E ✗

$x > y$
 $+1 - > +1 +$
✗



Q.13) Consider the following pairs:

Column 1	Column 2
1. $x^2 - 30x + 221 = 0$	13, 17 ✓
2. $y^2 - 36y + 323 = 0$	19, 17 ✓
3. $z = \sqrt{289}$	-17, 17 ✓

Which of the above pair is not correctly match?

- A. Only 2
- B. Only 3
- C. Only 1
- D. Both 1 and 3
- E. Both 2 and 3

$$z^2 = 289$$
$$z = +17, -17$$

$$z = \sqrt{289}$$
$$= +17$$

Roots
↓
Eqn ?



Q.14) $5x - 2y = 5$ and $1 + (x/y) = 8/5$.

Quantity I: Value of $3x + y$? $-3 \times 3 + 5 = 14 \rightarrow$

Quantity II: Value of $3y - x$? $-3 \times 5 - 3 = 12 \rightarrow$

- A. Quantity I > Quantity II
- B. Quantity I < Quantity II
- C. Quantity I \leq Quantity II
- D. Quantity I = quantity II or No relation
- E. Quantity I \geq Quantity II

$$5x - 2y = 5$$

$$5 \times 3 - 2 \times 5 = 5$$
$$5 = 5$$

$$1 + \frac{x}{y} = \frac{8}{5}$$

$$\frac{x}{y} = \frac{8}{5} - 1 = \frac{3}{5}$$



In the following questions three equations are given in variables x. Third equation is equal to the sum of the first two equations. You have to solve the questions based on given information.

I. $ax^2 + bx + 4 = 0$ ✓

II. $ax^2 + 3x + c = 0$ ✓

III. $2x^2 + 7x + \sqrt{49 - 13} = 0$ ✓

$a+a=2$ $b+3=7$ $4+c = \sqrt{49-13} = \sqrt{36} = 6$

$a=1$ $b=4$ $4+c=6$
 $c=2$

$2x^2 + 7x + 6 = 0$

Note: Eq 3 = Eq 1 + Eq 2

Q.15) What is the value of (b+c)?

- [a] 9
- [b] 7
- [c] 15
- ~~[d] 6~~
- [e] 10

$4+2 = 6$

Q.16) What is the product of the roots of equation III.

- ~~[a] 3~~
- [b] 16
- [c] 22
- [d] 14
- [e] 8

$\frac{+3}{2} \times \frac{+4}{2} = 3$

$+7 \quad 12$
 $3, 4$
 $x = \frac{-3}{2}, \frac{-4}{2}$



In the following questions three equations are given in variables x . Third equation is equal to the sum of the first two equations. You have to solve the questions based on given information.

I. $ax^2 + bx + 4 = 0$

II. $ax^2 + 3x + c = 0$

III. $2x^2 + 7x + \sqrt{49 - 13} = 0$

Note: Eq 3 = Eq 1 + Eq 2

Q.17) What is the square of the larger root of equation II?

[a] 1

[b] 25

[c] 16

[d] 9

[e] 4

Homework



In the following question two equations are given in variables x and y . You have to solve these equations and determine the relation between x and y

Q.18) I. $x^2 + 7x + 12 = 0$

II. $y^2 + 8y + 15 = 0$

- [a] $x > y$
- [b] $x < y$
- [c] $x \geq y$
- [d] $x \leq y$
- [e] $x = y$ or no relation between x and y

HW



Direction (19-21): Two columns, I and II are given. You have to solve the equations and answer the following questions.

	COLUMN I		COLUMN II
a).	$3x^2 - 900 = 2x^2$	e).	Irrational roots
b).	$x^2 - 24\sqrt{5}x + 400 = 0$	f).	One root is 260% of the other
c).	$x^2 - 56x + 768 = 0$	g).	Product of the roots is negative
d).	$5x^2 - 72x + 208 = 0$	h).	HCF of both the roots is 8



Q19. Find the sum of greater roots of (g) and (h)?

- a. 52
- b. 62
- c. 92
- d. 64
- e. None of these

Q20. Which of the statements is not true?

I). Product of greater roots of (g) and (f), gives 312.

II). Division of roots of (g) yield - 10.

III). Sum of smaller roots of (g), (h) and (f) yield - 2.

- a. Only II
- b. Only I
- c. Only III
- d. Both I and II
- e. Both II and III

Q21. Which of the combinations follow?

- a. a - e, b - g, c - f and d - h
- b. a - g, b - f, c - e and d - h
- c. a - g, b - e, c - h and d - f
- d. a - f, b - e, c - g and d - h
- e. None of these

Thank You

HW = 7, 18, 19, 20, 21¹⁷

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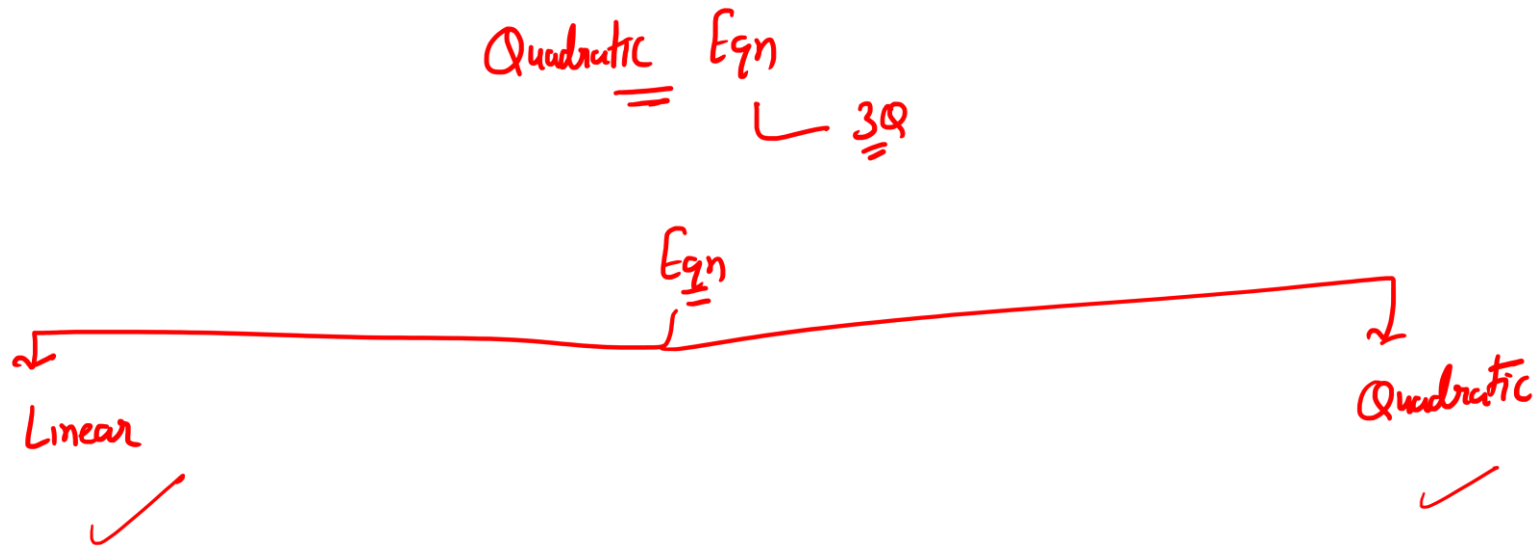
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Quadratic Equation

- Basic knowledge about an equation ✓✓
- How to find roots of a quadratic equation ✓✓
- Relation between roots ✓
- Nature of roots ✓

next
//



Eqn

Linear

$ax + by + c = 0$

$2x + 3y = 13$ (1) $\times 5$
 $5x + 9y = 37$ (2) $\times 2$
 $10x + 15y = 65$
 $10x + 18y = 74$
 $3y = 9$
 $y = \frac{9}{3} = 3$
 $2x + 3(3) = 13$
 $2x = 13 - 9 = 4$
 $x = \frac{4}{2} = 2$

(1) $x > y$

~~(2) $x < y$~~

(3) $x = y$

(4) No relation

$x = 2$
 $y = 3$
 $x < y$

Quadratic

$ax^2 + bx + c = 0$

Power = 2

a, b, c real No.

$a \neq 0$



How to find Roots:-

$$x^2 + 7x + 12 = 0$$

Basic

$$ax^2 + bx + c = 0$$

$$a=1 \\ b=7 \\ c=12$$

$$\text{Roots} = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$\frac{-7 \pm \sqrt{(7)^2 - 4 \times 1 \times 12}}{2 \times 1}$$

$$= \frac{-7 \pm 1}{2} = \frac{-7+1}{2}, \frac{-7-1}{2}$$
$$= \boxed{-3, -4}$$

$$ax^2 + bx + c = 0$$

α, β

$$\alpha + \beta = -\frac{b}{a}$$

$$\alpha \times \beta = \frac{c}{a}$$

Prove
↓
Next class



$$\underline{x^2} + \underline{7x} + \underline{12} = 0$$

α, β

- ① $\alpha + \beta = +7$ $\alpha\beta = 12 \times 1 = 12$
- ② $4, 3$ \downarrow
 $2 \times 2 \times 3$
- ③ $x = \frac{-4}{1}, \frac{-3}{1} =$



$$\begin{array}{r|l} 2 & 12 \\ \hline 2 & 6 \\ \hline & 3 \end{array}$$

$$y^2 - 8y + 20 = 0$$

- ① $\alpha + \beta = -8$ $\alpha\beta = -20$
- ② $-10, +2$
- ③ $y = \frac{10}{1}, \frac{-2}{1} = 10, -2$



Relation btwn Roots

① $x > y$

$x = 5, 7$ $y = 3, 4$

x y

$5 > 3$

$7 > 3$

$5 > 4$

$7 > 4$

③ $x \geq y$

$x = 5, 7$

$y = 4, 5$

x y

$5 > 4$

$7 > 4$

$5 = 5$

$7 > 5$

④ $x \leq y$

$x = 4, 5$

$y = 5, 7$

② $x < y$

$x = 3, 4$ $y = 5, 7$



(5) Equal, No relation can be established

$$x = 4, 4$$
$$y = 4, 4$$

< >
Opposite sign

$$x = 5, 10$$
$$y = 6, 12$$

x		y
5	<	6
10	>	6
5		12
10		12



Quadratic Equation

Firstly check

$$ax^2 + bx + c = 0$$

b	c		Nature of Roots
+	+	=	- -
-	+	=	+ +
+/-	-	=	+ -

✓
✓

$x^2 + 7x + 10 = 0$ (-, -)

$y^2 - 8y + 12 = 0$ (+, +)

- ① $x > y$
- ~~② $x < y$~~
- ③ $x \geq y$
- ④ $x \leq y$
- ⑤ No relation

(1) Eqn

(2) Roots = ?

(3) Relats btwn Roots = ?



$$ax^2 + bx + c = 0$$

b	c	
+	+	(-, -)
-	+	(+, +)
+/-	-	(+, -)

✓✓

Nature of Roots

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$b^2 - 4ac = D \rightarrow$ Discriminant
 \downarrow
Nature of Roots

$D > 0 \rightarrow$ Real, Unequal ✓✓

$D = 0 \rightarrow$ Real, equal

$D < 0 \rightarrow$ Imaginary ✓

$$x^2 - 7x + 12 = 0 \quad (+, +)$$

$$D = (-7)^2 - 4(1)(12) \\ = 49 - 48 \\ = 1$$



$$ax^2 + bx + c = 0$$

α, β ,

$$(x - \alpha)(x - \beta) = 0$$

$$x^2 - \alpha x - \beta x + \alpha\beta = 0$$

$$x^2 - (\alpha + \beta)x + \alpha\beta = 0$$

$5, -8$ $\alpha = 5$ $\beta = -8$

$$x^2 - (5 - 8)x + (5 \times -8) = 0$$

$$x^2 + 3x - 40 = 0 \quad \checkmark$$

$$ax^2 + bx + c = 0$$

Dividing both side by a

$$x^2 + \frac{b}{a}x + \frac{c}{a} = 0$$

$$-(\alpha + \beta) = \frac{b}{a}$$

$$\alpha + \beta = -\frac{b}{a}$$

Sum of Roots = $-\frac{b}{a}$

$$\alpha\beta = \frac{c}{a}$$

$$\text{Product of Roots} = \frac{c}{a}$$



- ① Eqn
- ② How to find Roots
- ③ How to make relation btwn Roots
- ④ Nature of Roots
- ⑤ Roots \rightarrow Eqn
- ⑥ Sum of Roots
Product of —

==





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Direction (19-21): Two columns, I and II are given. You have to solve the equations and answer the following questions.

	COLUMN I		COLUMN II
a).	$3x^2 - 900 = 2x^2$	e).	<u>Irrational roots</u>
b).	$x^2 - 24\sqrt{5}x + 400 = 0$	f).	One root is <u>260%</u> of the other
c).	$x^2 - 56x + 768 = 0$	g).	Product of the roots is <u>negative</u>
d).	$5x^2 - 72x + 208 = 0$	h).	HCF of both the roots is <u>8</u>

e - b
f - d
g - a
h - c

(a) $3x^2 - 900 = 2x^2$
 $x^2 = 900$
 $x = +30, -30$

(b) $x^2 - 24\sqrt{5}x + 400 = 0$
 $\alpha + \beta = -24\sqrt{5}$ $\alpha\beta = 400$
 $= -24$ 80
 $-20, -4$
 $-20\sqrt{5}, -4\sqrt{5}$
 $x = 20\sqrt{5}, 4\sqrt{5}$

(c) $x^2 - 56x + 768 = 0$
 -56 768
 $-32, -24$
 $x = 32, 24$

(d) $5x^2 - 72x + 208 = 0$
 $\alpha + \beta = -72$ $\alpha\beta = 208 \times 5$
 $= 1040$
 $-52, -20$
 $x = \frac{52}{5}, \frac{20}{5} = 10.4, 4$



Q19. Find the sum of greater roots of (g) and (h)?

- a. 52
- b. 62
- c. 92
- d. 64
- e. None of these

$$30 + 32 = 62$$

Q20. Which of the statements is not true?

I). Product of greater roots of (g) and (f), gives 312.

II). Division of roots of (g) yield - 10.

III). Sum of smaller roots of (g), (h) and (f) yield - 2.

- a. Only II
- b. Only I
- c. Only III
- d. Both I and II
- e. Both II and III

$$30 \times 10.4 = 312$$

$$\begin{array}{r} -30 \\ 24 \\ \hline 4 \\ -2 \\ \hline \end{array}$$

Q21. Which of the combinations follow?

a. a - e, b - g, c - f and d - h

b. a - g, b - f, c - e and d - h

c. a - g, b - e, c - h and d - f

d. a - f, b - e, c - g and d - h

e. None of these

Q.22) If 'a' and 'b' are the roots of the equation $x^2 + 5x + 6 = 0$, then find out the equation whose roots are '2a' and '2b'.

[1] $x^2 + 8x + 24 = 0$

[2] $x^2 + 12x + 44 = 0$

~~[3] $x^2 + 10x + 24 = 0$~~

[4] $x^2 + 16x + 56 = 0$

[5] Can't be determined

$$\begin{array}{ccc}
 & \underbrace{} & \\
 & \downarrow & \\
 5 & & 6 \\
 & 2, 3 & \\
 x = -2, -3 & & \\
 & & \begin{array}{cc}
 2a & 2b \\
 \downarrow & \downarrow \\
 2x-2 & 2x-3 \\
 = -4 & -6 \\
 \checkmark & \checkmark
 \end{array}
 \end{array}$$

$$x^2 - (\alpha + \beta)x + \alpha\beta = 0$$

$$x^2 - (-4 - 6)x + (-4)(-6) = 0$$

$$x^2 + 10x + 24 = 0$$



Q.23) The equation $x^2 - px - 72 = 0$, has two roots 'a' and 'b' such that $(a - b) = 18$ and $p > 0$. If a series starts with 'p' such that the consecutive terms are 4 more than the preceding term is formed, then find the 4th term of such series.

[1] 18

[2] 12

[3] 10

[4] 16

[5] 14

$$x^2 - px - 72 = 0$$

$$a + b = -(-p)$$

$$a + b = p$$

$$a \times b = -72$$

$$a - b = 18$$

$$p > 0$$

$$a \times b = -72$$

$$1 \quad 72 \times$$

$$2 \quad 36 \times$$

$$3 \quad 24 \times$$

$$4 \quad 18 \times$$

$$6 \quad 12 \quad \checkmark$$

$$a = 6$$

$$b = -12$$

$$a = 12 \quad b = -6$$

$$a - b = 18$$

$$6 - (-12) = 18$$

$$a + b = p$$

$$12 - 6 = p$$

$$6 - 12 = p$$

$$p = -6$$

$$a = 12$$

$$b = -6$$

$$a + b = p$$

$$12 - 6 = p$$

$$p = 6$$

$$6 \quad \overset{+4}{\curvearrowright} \quad 10 \quad \overset{+4}{\curvearrowright} \quad 14 \quad \overset{+4}{\curvearrowright} \quad 18$$



Q.24) Solve the given equations and find the relation between x and y.

I: $4x^2 + 2ax - 116 = 0$

II: $3y^2 + 3by + 15a = 0$

III: $135\% \text{ of } 480 + a\% \text{ of } 320 = 728$

IV: $464 \div 29 \times 10 + 126 = b + 256$

[1] $x > y$

[2] $x < y$

[3] $x \geq y$

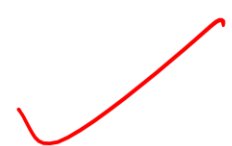
[4] $x \leq y$

[5] ~~Either $x = y$ or the relation cannot be established~~

$(480 + 144 + 24)$
 $\frac{a}{100} \times 320 = 728 - 648 = 80$
 $a = 25$
 $286 - 256 = 30$
 $b = 30$

$4x^2 + 50x - 116 = 0$
 $2x^2 + 25x - 58 = 0$
 $25 \quad -116$
 $29, -4$
 $x = \frac{-29 \pm 4}{2}$
 $= -14.5 \pm 2$

$3y^2 + 90y + 375 = 0$
 $y^2 + 30y + 125 = 0$
 $+30 \quad 125$
 $25, 5$
 $y = -25, -5$
 $x \quad y$
 $-14.5 \text{ (S)} -25 -$
 $-14.5 \text{ (K)} -5 -$



Q.25) Solve the given four equations and find the relation between x and y.

I: $4x^2 - 4ax + 120 = 0$

II: $2y^2 - 26y + 7b = 0$

III: $\sqrt{2^a} = (8^3 \times 5^2) \div (200\sqrt{2})$

IV: $b + (1.6)^2 \div (0.8)^2 = [(2.4)^2 \div (0.6)^2]$

Homework

[1] $x > y$

[2] $x < y$

[3] $x \geq y$

[4] $x \leq y$

[5] Either $x = y$ or the relation cannot be established



Directions (Q. 26-27): Read the following information carefully to answer the questions that follow.

In the following questions an equation followed by some information is given. You have to choose best suitable option.

$$x^2 - 28x + k = 0$$

Root of the equation are a and b.

Here, $a^2 = 9b$ and $a, b > 0$.

$$a+b = -(-28) \Rightarrow a+b = 28$$

$$a^2 = 9b$$

$$b = \frac{a^2}{9}$$

$$a + \frac{a^2}{9} = 28$$

$$9a + a^2 = 252$$

$$a^2 + 9a - 252 = 0$$

$$\frac{21}{12} = \frac{252}{252}$$

Q26. Find the value of k.

- A. 336
- B. 252
- C. 125
- ~~D. 192~~
- E. None of these

$$12 \times 16 = 192$$

Q27. Find the equation whose roots are $1/a$ and $1/b$.

- A. $192x^2 + 28x + 1 = 0$
- B. $192x^2 - 28x + 1 = 0$
- C. $192x^2 + 28x - 1 = 0$
- D. $192x^2 - 28x - 1 = 0$
- E. None of these

$$x^2 - (\alpha + \beta)x + \alpha\beta = 0$$

$$x^2 - \left(\frac{1}{12} + \frac{1}{16}\right)x + \frac{1}{12} \times \frac{1}{16} = 0$$

$$x^2 - \frac{28}{192}x + \frac{1}{192} = 0$$

$$192x^2 - 28x + 1 = 0$$

$$21, -12$$

$$a = -21, (+12)$$



Directions (Q. 28-29): Read the following information carefully to answer the questions that follow.
In the following questions an equation followed by some information is given. You have to choose best suitable option.

$$x^2 - Kx - 64 = 0$$

Root of the equation are a and b. Value of $(a - b) = 20$

Q28. Find the value of $a^2 + b^2$.

- A. 264
- B. 272
- C. 296
- D. 308
- E. None of these

Home Work

Q29. Find the value of $(k + 4)^2$ and $k > 0$.

- A. 169
- B. 196
- C. 225
- D. 256
- E. Cannot be determine

Q.30) Given below are 3 equations I, II and III where 'a' and 'b' are the roots of equation I where $(a < b)$ and 'c' and 'd' are roots of equation II where $(c < d)$. On this basis, solve for equation III and find the relationship between 'z' and 'k' given that $k = 11$.

I. $3x(x - 12) + 72 = x^2 - 11x - 5$

II. $5y(y - 3) - 64 = y(3y - 2) - 19$

III. $(z + 2a - d)^2 = 169$

[1] $z > k$

[2] $z < k$

[3] $z = k$ or the relationship cannot be established

[4] $z \geq k$

[5] $z \leq k$

$(2 + 11 - 9)^2 = 169$
 $(2 + 2)^2 = 169$

$z + 2 = +13, -13$

$z + 2 = 13$

$z = 11$

$z + 2 = -13$

$z = -15$

$z = 11 = 11$
 $z = -15 < 11$

$z \leq k$

$3x^2 - 36x + 72 - x^2 + 11x + 5 = 0$

$2x^2 - 25x + 77 = 0$

$-25 \quad 77 \times 2$
 $-14, -11 \quad 7 \times 11 \times 2$

$x = \frac{14}{2}, \frac{11}{2} = 7, 5.5$

$a < b$

$a = 5.5$

$b = 7$

$5y^2 - 35y - 64 - 3y^2 + 2y + 19 = 0$

$2y^2 - 13y + 45 = 0$

$c + d = -13 \quad c \times d = -45 \times 2 = -90$

$-18, +5$

$\frac{18}{2} \quad \frac{-5}{2} = 9, -2.5$

$c = -2.5$

$d = 9$



Q.31) Given below are three equations i.e. 'I', 'II' and 'III'. If roots of the equation 'I' are 'p' and 'q', respectively such that $p > q$ while the roots of the equation 'II' are 'm' and 'n' respectively such that $m > n$, then find the value of 'K'.

I. $2x^2 - 6(x + 4) = 3x + 11$

II. $2y^2 - 12(y - 4) = 7y + 6$

III. $(15m/2) - 8q = 9p - 4n + K^2$

[1] 11

[2] 4

[3] 7

[4] 9

[5] 14

Homework



Direction (32-33): Read the following information carefully and answer the questions based on it.

There are three equations given. You are expected to solve them and answer the questions accordingly.

I. $3P^2 - 80P + 192 = 0$

$\alpha + \beta = -80$
 $\alpha\beta = 192 \times 3 = 576$
 $\frac{-72, -8}{3, 3} = 24, \frac{8}{3}$

III. $S^2 + (S - 2T - 1)^2 + 4TS + 4T^2 = 0$

II. $1/Q + 1/R = 1/6$, where Q and R both positive integers ($Q > R$)

III. $S^2 + (S - 2T - 1)^2 = (-1) \times 4T(S + T)$

① $\frac{1}{Q} + \frac{1}{R} = \frac{1}{6}$
 $\frac{1}{Q} = \frac{1}{6} - \frac{1}{R}$
 $\frac{1}{Q} = \frac{R-6}{6R}$

$Q > R$

Q	R
42	7
24	8
18	9
15	10

$12 = \frac{11 \times 12}{13}$

$Q = \frac{6R}{R-6}$
 $R > 6 = \frac{42}{1}, \frac{48}{2}, \frac{54}{3}, \frac{60}{4}, \frac{66}{5}, \frac{72}{6}$

$(S+2T)^2 + (S-2T-1)^2 = 0$

$S+2T=0$
 $S-2T-1=0$
 $S = -2T$
 $S = 2T+1$

$-2T = 2T+1$
 $4T = -1$
 $T = -\frac{1}{4}$

$S = 7 \times 2 + \frac{1}{4} \times 2$

$S = \frac{1}{2}$
 $T = -\frac{1}{4}$



Q.32) Find the maximum possible value of (P + Q).

- a. 83
- b. 91
- c. 77
- d. 66
- e. None of these

$$\begin{array}{r} 24 \\ 42 \\ \hline 66 \end{array}$$

Q.33) Find value of [20(S - 3T)].

- a. 25
- b. 20
- c. 40
- d. 50
- e. Can't be determined

$$\begin{aligned} & 20\left(\frac{1}{2} - 3 \times \left(-\frac{1}{4}\right)\right) \\ & 20\left[\frac{1}{2} + \frac{3}{4}\right] \\ & = 20 \times \frac{2+3}{4} = \frac{20 \times 5}{4} = \underline{\underline{25}} \end{aligned}$$



Q.34) Which of the following pair of symbols will define the relation between Quantity I and Quantity II and between Quantity II and Quantity III respectively?

- A. =
- B. >
- C. <
- D. \geq
- E. \leq
- F. # (relation cannot be established)

HW ✓✓

'p', 'q' and 'r' are three distinct positive roots of the given equation such that 'p' > 'q' > 'r'.

$$x^3 - 9x^2 + 23x - 15 = 0$$

Quantity I: Find the value of '8p'.

Quantity II: Find the value of (q + 40).

Quantity III: Find the value of (r X 20).

- [1] C, B
- [2] B, C
- [3] A, B
- [4] B, A
- [5] C, A



Thank You

Hw
Q=25
Q=28
Q=29
Q=31
Q=34
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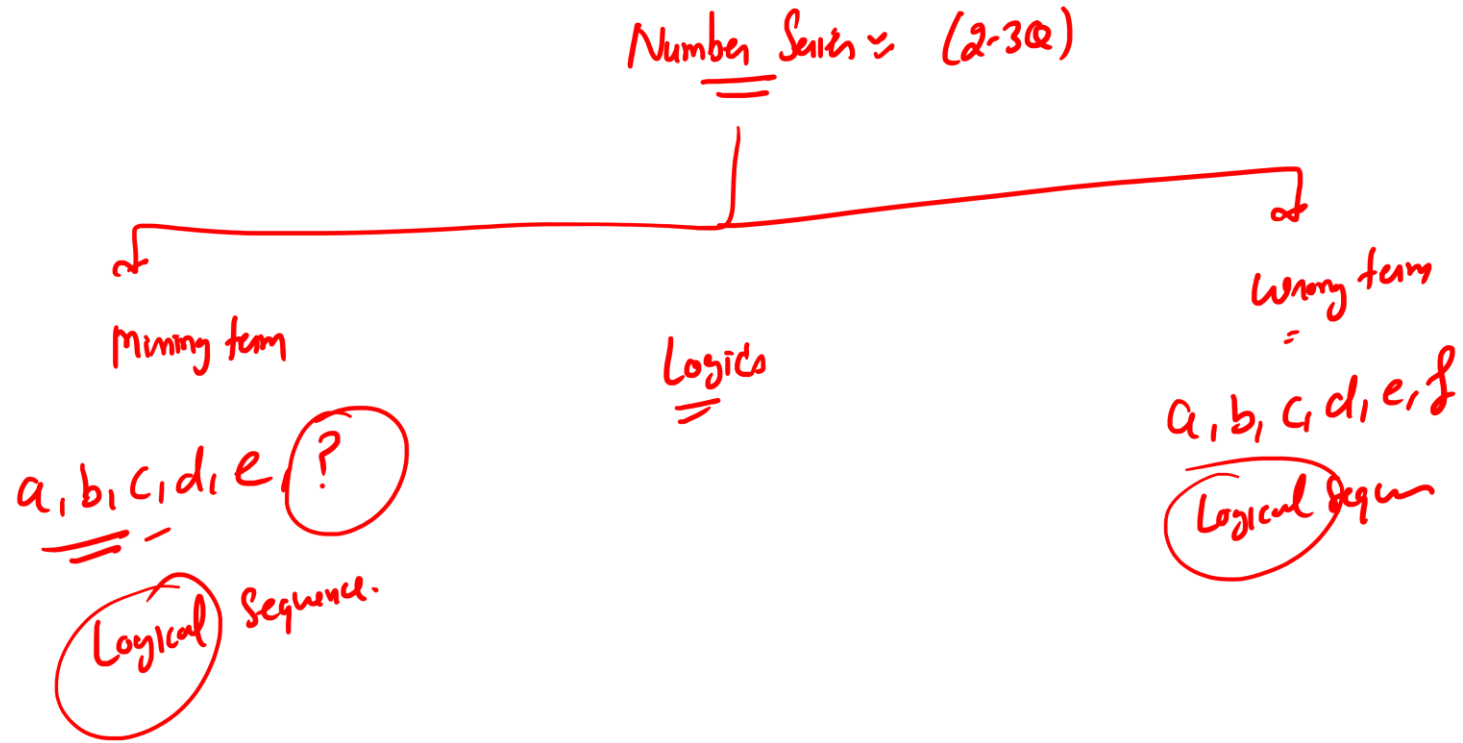
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Basic Need to solve Number Series Questions

- Tables ✓
- Sum ✓
- Multiplication ✓
- Square ✓ 25 ✓ ✓
- Square root ✓ ✓
- Cube ✓ 10-15 ✓
- Cube root ✓ ✓
- Basic percentage ✓
- Basic fractions ✓



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Square ⇨

$1^2 = 1$

$2^2 = 4$

$3^2 = 9$

$4^2 = 16$

$5^2 = 25$

$6^2 = 36$

$7^2 = 49$

$8^2 = 64$

$9^2 = 81$

$10^2 = 100$

$11^2 = 121$

$12^2 = 144$

$13^2 = 169$

$14^2 = 196$

$15^2 = 225$

$16^2 = 256$

$17^2 = 289$

$18^2 = 324$

$19^2 = 361$

$20^2 = 400$

$21^2 = 441$

$22^2 = 484$

$23^2 = 529$

$24^2 = 576$

$25^2 = 625$



Cube

$$1^3 = 1$$

$$2^3 = 8$$

$$3^3 = 27$$

$$4^3 = 64$$

$$5^3 = 125$$

$$6^3 = 216$$

$$7^3 = 343$$

$$8^3 = 512$$

$$9^3 = 729$$

$$10^3 = 1000$$

$$11^3 = 1331$$

$$12^3 = 1728 \checkmark$$

$$13^3 = 2197$$

$$14^3 = 2744$$

$$15^3 = 3375$$



Practice
↓
200-300Q

Logic's
✓



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Consecutive terms
diff - Minimum
Shunts

① Sum

$$\begin{matrix} 11 & 15 & 23 & 39 & 71 & ? & 135 \\ \hline +4 & +8 & +16 & +32 & +64 & & \end{matrix}$$

$$\begin{matrix} 11 & 7 & 15 & -1 & 33 & ? \\ \hline -4 & +8 & -16 & +32 & & \end{matrix}$$

② Subtraction

$$\begin{matrix} +1, +2, +3, \dots \\ +5, +10, \dots \\ -2, -4, \dots \end{matrix}$$

Common terms
diff - Max.
Org.

③ Multiplication

$$\begin{matrix} 10 & 30 & 150 & 1050 & 11550 & ? \\ \hline \times 3 & \times 5 & \times 7 & \times 11 & \times 13 & \end{matrix} \quad \times, \div$$

④ Divide

$$\begin{matrix} 10 & 14 & 41 & 57 & 182 & 218 \\ \hline +4 & +27 & +16 & +125 & +36 \\ \hline 22 & 33 & 42 & 53 & 6 & 2 \end{matrix}$$

⑤ $\times \pm$

⑥ $\div \pm$

⑦ Square

$$\begin{matrix} 10 & 14 & 23 & 39 & 64 & ? \\ \hline +4 & +9 & +16 & +25 & +36 \\ \hline 2^2 & 3^2 & 4^2 & 5^2 & 6^2 & \end{matrix}$$

⑧ Cube

⑨ Square \pm , \times

⑩ Cube \pm , \times

⑪ Double / Triple Series

⑫ Illogical Series

$$\begin{array}{cccccc}
 141 & 147 & 159 & 174 & 186 & ? \\
 \hline
 & +6 & +12 & +15 & +12 & \\
 \hline
 1+4+1 & 1+4+7 & 1+5+9 & 1+7+9 & &
 \end{array}$$

Even = 2, 4, 6, 8, 10, ~~12~~

Odd = 1, 3, 5, 7, 9, 11, _____

Prime = 2, 3, 5, 7, 11, 13, _____

Composite = 4, 6, 8, 9, 10, 12, _____

Sum of digit





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Q.1) A number series given below as I. A second number series as II having first term same as the wrong term of the series I. Find 3rd term of series II?

Series I. 3, 7, 22, 95, 479, 2879

- A. 541
B. 137
C. 561
D. 551
E. None of these

Handwritten analysis for Series I:

$$\begin{array}{cccccc} & & \times 3 & \times 4 & \times 5 & \times 6 \\ 3 & \times 2 & 7 & 22 & 95 & 479 & 2879 \\ +1 & +1 & +7 & +4 & +5 & & \\ +2 & +3 & & & & & \end{array}$$

Handwritten analysis for Series II:

$$\begin{array}{ccc} 22 & 45 & 137 \\ \times 2 & \times 3 & \\ +1 & +2 & \end{array}$$



Direction (2 – 3): Read the following information carefully and answer the questions based on it.

A sequence of numbers is given to you as below:

18 (A) (B) (C) (D) 124

Where, $A = P^2 - Q$ $A = 1 + 2 = 3$

$B - A = (P + 1)^2 + Q$ $B = 3 + 4 - 2 = 5$

$C - B = (P + 2)^2 + Q$ $C = 5 + 9 - 2 = 12$

$D - C = (P + 3)^2 + Q$ $D = 12 + 16 - 2 = 26$

$P = \text{HCF of } L \text{ and } M$, where L and M are co-primes $P = 1$

$Q = \text{Smaller root of } K^2 - 2K - 8 = 0$ $Q = -2$

18	A	B	C	D	124
✓	3	5	12	26	
	✓		✓		

$$K^2 - 2K - 8 = 0$$
$$-2 \quad -8$$
$$-4, +2$$
$$K = 4, -2$$

Q.2) How many numbers are divisible by 3, in the given sequence?

- A. 2
- B. 4
- C. 3
- D. 6
- E. None of these

Q.3) Find the value of $(A^2 + 3B + 5C - 4D)$.

- A. -20
- B. -10
- C. -18
- D. -30
- E. None of these

$$9 + 15 + 60 - 104$$
$$84 - 104 = -20$$



A series is given below where the first term is marked as (a), the second as (b), third as (c) and so on.

Series – 100, 95, 105, 88, 114, ?

(a) (b) (c) (d) (e) (f)

Q.4) What is the value of '(f)'?

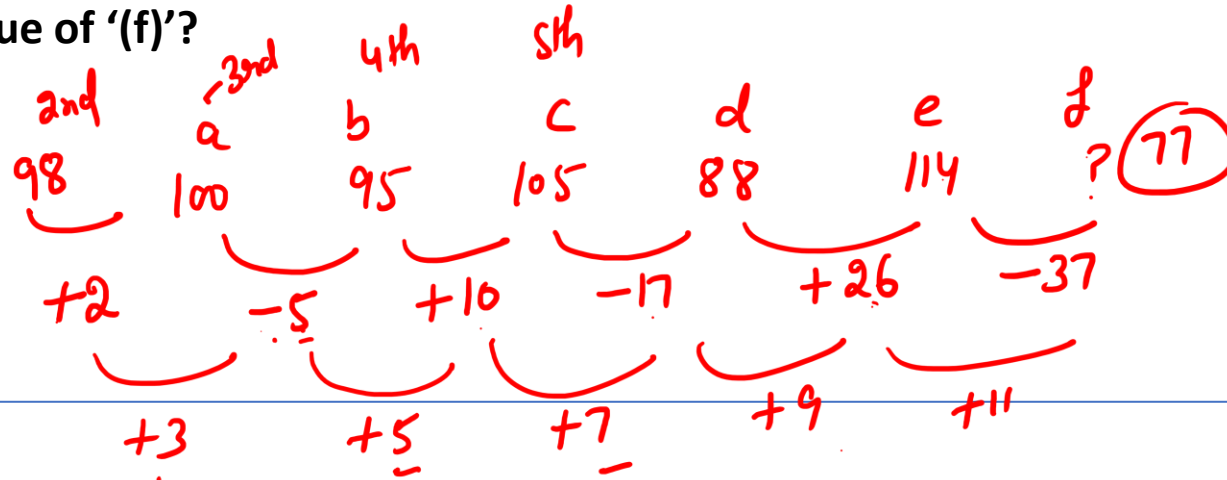
[a] 67

[b] 87

[c] 77

[d] 74

[e] 81



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A series is given below where the first term is marked as (a), the second as (b), third as (c) and so on.

Series – 100, 95, 105, 88, 114, ?

(a) (b) (c) (d) (e) (f)

Q.5) If a new series is made following the same pattern of the above series, where (a) is the third term, (b) is the fourth term, (c) is the fifth term and so on. Then find the second term of such a series.

[a] 99

[b] 98

[c] 102

[d] 111

[e] None of the above



A series is given below where the first term is marked as (a), the second as (b), third as (c) and so on.

Series – 100, 95, 105, 88, 114, ?

(a) (b) (c) (d) (e) (f)

Q.6) What minimum number should be added to the 'f+20' to get to the nearest perfect square.

[a] 4

[b] 1

[c] 7

[d] 3

[e] 6

$$f = 77$$
$$77 + 20 = 97$$
$$+3$$

100



Q.7) The series given below contains a missing number 'P'. Find the value of 'P' and determine which among the given three statement(s) is/are true.

74, 290, 241, 753, 672, 'P', 1551

I: The nearest perfect square number to 'P' is 1600

II: 'P' is divisible by 11

III: (P + 28) is a multiple of 50.

[1] Only I

[2] Only II

[3] Only I and II

~~[4] Only II and III~~

[5] Only III

Handwritten solution:

$P = 1672$

$40^2 = 1600$
 $41^2 = 1681$

1672 (circled)

$8 - 8 = 0$

$\frac{1672}{11}$

$1672 + 28 = 1700 = 5P$

Series analysis:

74	290	241	753	672	P	1551
+216	-49	+512	-81	+1000	-121	
6^3	7^2	8^3	9^2	10^3	11^2	



Q.8) Given below are two number series I and II where the missing numbers in series I and II are 'P' and 'Q', respectively. Find the value of 'P' and 'Q' and find which among the given options gives the correct value of (P - Q)

I: 5000, 4000, 3000, 2100, P, 819

II: 4, 6, 15, 56, Q, 1644

[1] 1120

[2] 1090 ✓✓

[3] 980

[4] 1240

[5] 1050

$$\begin{array}{l}
 5000 \quad \left. \begin{array}{l} \\ \\ \\ \\ \\ \end{array} \right\} \begin{array}{l} \times 8 \\ \times 7.5 \\ \times 7 \\ \times 6.5 \\ \times 6 \end{array} \\
 4000 \\
 3000 \\
 2100 \\
 1365 = P \\
 819
 \end{array}$$

$$\begin{array}{l}
 4 \quad \left. \begin{array}{l} \\ \\ \\ \\ \end{array} \right\} \begin{array}{l} \times 2 - 2 \\ \times 3 - 3 \\ \times 4 - 4 \\ \times 5 - 5 = 275 \end{array} \\
 6 \\
 15 \\
 56 \\
 Q = 275 \\
 1644
 \end{array}$$

$$\begin{array}{r}
 P = 1365 \\
 Q = 275 \\
 \hline
 1090
 \end{array}$$



Q.9) Given below are two number series I and II where the missing numbers in series 'I' and 'II' are 'P' and 'Q', respectively. Find the value of 'P' and 'Q' and find which among the given options gives the L.C.M of 'P' and 'Q'.

I: 77, 106, 48, P, 19, 164

II: 141, 98, Q, 63, 71, 96

[1] 1080 ✓✓

[2] 1200

[3] 724

[4] 960

[5] 1440

77) +29
106) -58
48) +87
P = 135
19) -116
164) +145

72 × 8
135 × 8 = 1080

141] -43
98] -26
Q = 72] -9] 17
63] +8] 17
71] +25] 17
96]

P = 135
Q = 72

LCM = 135 × 8
= 1080



Direction (10-12): Study the following information carefully and answer the questions given below
Find out the wrong number in the following series.

Q10. 47, 240, 1446, 10120, 81040, 729369

- A. 240
- B. 1446
- C. 10120
- D. 47
- E. 81040

Handwritten analysis of the series:

10129

$\times 5$	$\times 6$	$\times 7$	$\times 8$	$\times 9$
+5	+6	+7	+8	+9

729 360

10122
+7

4

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Q11. 2, 14, 91, 546, 3003, 15517, 67567.5

$\times 7$ $\times 6.5$ $\times 6$ $\times 5.5$ $\times 5$

A. 3003

B. 91

C. 15517 ✓

D. 546

E. 14

2730
273

3003



Q12. 25, 187, 793, 3181, 9553, 19117, 19129

- A. 793
- B. 3181
- C. 25
- ~~D. 187~~
- E. 9553

157

$$\begin{array}{cccccc} \text{x6} & \text{x5} & \text{x4} & \text{x3} & \text{x2} & \text{x1} \\ +7 & +8 & +9 & +10 & +11 & +12 \end{array}$$

$$\begin{array}{r} \text{x7} \ 175 \\ +12 \\ \hline 3172 \end{array} \quad \boxed{9543} \quad \begin{array}{r} 19106 \\ \end{array}$$

$$\begin{array}{r} 157 \times 5 + 8 = 793 \\ \underline{785} + 8 \end{array}$$

$$\begin{array}{l} \text{x6} + 7 \\ \text{x5} + 8 \\ \text{x4} + 9 \\ \text{x3} + 10 \\ \text{x2} + 11 \\ \text{x1} + 12 \end{array}$$



Q.13) The following numbers form a series followed by (?). Find the odd one out and then find the missing number that will come in place of the question mark (?) according to the series?

92, 101, 226, 275, 1004, 1125, ?

$+9$ $+125$ $+49$ $+729$ $+121$ 2197
 3^2 5^3 7^2 9^3 11^2 13^3

3322

[1] 1125, 2856

[2] 101, 3015

[3] 1004, 2012

[4] 226, 2126

~~[5] 285, 3322~~



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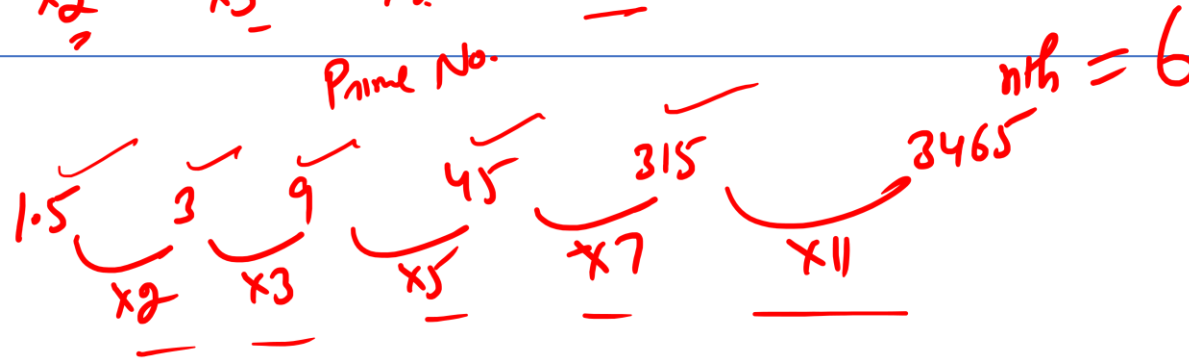
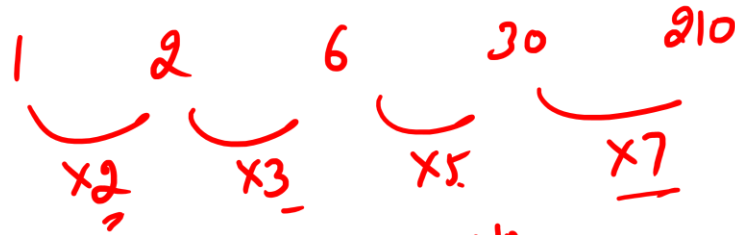
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The below are two series. Series I follows a certain pattern, follow the same pattern in Series II and answer the question given below :

Q.14) Series I : 1, 2, 6, 30, 210

Series II : 1.5 If 3465 is the n^{th} term find the value of n .

- [1] 5
- [2] 7
- ~~[3] 6~~
- [4] 9
- [5] 11



The questions below are based on the given Series-I. The series-I satisfy a certain pattern, follow the same pattern in Series-II and answer the questions given below.



Q.15) I. 1024, 1267, 1348, 1510, 1564, 1672, 1708

II. 961 ... 1717. If 1717 is nth term, then what value should come in the place of (n - 2) th term?

- [1] 1876
- [2] 1709
- [3] 1609 ✓
- [4] 1568
- [5] 1436

$1024 \rightarrow +243 \rightarrow \div 3$
 $1267 \rightarrow +81 \rightarrow \times 2$
 $1348 \rightarrow +162 \rightarrow \div 3$
 $1510 \rightarrow +54 \rightarrow \times 2$
 $1564 \rightarrow +108 \rightarrow \div 3$
 $1672 \rightarrow +36 \rightarrow \times 2$
 $1708 \rightarrow +72 \rightarrow \div 3$

$961 \rightarrow +243$
 $1204 \rightarrow +81$
 $1285 \rightarrow +162$
 $1447 \rightarrow +54$
 $1501 \rightarrow +108$
 $1609 \rightarrow n-2 = ?$
 $1645 \rightarrow n-1 \rightarrow +36$
 $1717 \rightarrow nth \rightarrow +72$



Q.16) (I) 3 , 35 , A , 1160 , 4660 , 13998

(II) 80 , 42 , B , 13.5 , 8.75 , 6.375 , 5.1875

Solve both the above series and find which of the following is correct.

(A) $10B - A = 4$

3

35

A

1160

4660

13998

(B) $16^2 = A + B + 5$

(C) $10B < A$

[1] Only A

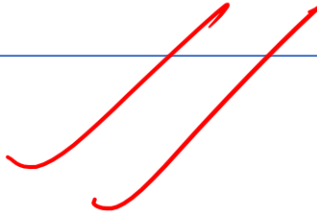
[2] Only B

[3] Only C

[4] Both A and B

[5] None of these

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Directions: Answer the questions based on the information given below.

Consider the four following missing number series I, II, III and IV.

Series I: 71, 72, 74, 78, 86, 102

$$\begin{array}{cccccc} \underbrace{+1} & \underbrace{+2} & \underbrace{+4} & \underbrace{+8} & \underbrace{+16} & \\ +1 & +2 & +4 & +8 & +16 & \end{array}$$

$$s = 86$$

Series II: 570, 282, 138, 66, 30, 12

$$\begin{array}{cccccc} \underbrace{\div 2} & \underbrace{\div 3} & \underbrace{\div 2} & \underbrace{\div 2} & \underbrace{\div 3} & \underbrace{\div 2} \\ \div 2 & \div 3 & \div 2 & \div 2 & \div 3 & \div 2 \end{array}$$

$$x = 66$$

Series III: 637, 612, 576, 527, 463, 382

$$\begin{array}{cccccc} \underbrace{-25} & \underbrace{-36} & \underbrace{+49} & \underbrace{-64} & \underbrace{-81} & \\ -25 & -36 & +49 & -64 & -81 & \end{array}$$

$$y = 612$$

Series IV: 16, 24, 40, 56, 88, 104

$$\begin{array}{cccccc} \downarrow & \downarrow & \downarrow & \downarrow & \downarrow & \downarrow \\ 8 \times 2 & 8 \times 3 & 8 \times 5 & 8 \times 7 & 8 \times 11 & 8 \times 13 \end{array}$$

$$z = 88$$

Q.17) If missing term of series (I), (II), (III) and (IV) are represented by 's', 'x', 'y' and 'z' respectively then the value of 'y' is what percent more/less than the average value of 's', 'x' and 'z'?

- A. 650%
- B. 655%
- C. 660%
- ~~D. 665%~~
- E. 670%

$$y = 612 \quad \frac{s+x+z}{3} = \frac{86+66+88}{3} = 80$$

$$\frac{86+66+88}{3} = \frac{240}{3} = 80$$

$$612 - 80 = 532$$

$$\frac{532}{80} \times 100 = 665\%$$



Directions(18-19) Answer the questions based on the information given below.

Two series 'I' and 'II' are given below. Determine the values of variables given in both series and answer the given questions based on that.

I. 'A', 33, (8B+4), 169, (A² + 2A), 441

II. 2, 'B', 37, 101, 226, (B+432), 785

Handwritten notes for Series I: 16, 84, 288, A² + 2A = 288, 856 + 32 = 288

Handwritten notes for Series II: 1297, B=10, A=16, (16)^{3/2} = 64, (4³)^{3/2} = 64

Handwritten calculations for Series I: 17, 51, +85, +119, 10, 442, +153

Handwritten calculations for Series II: 10, +64, +125, +216, +343, +512, 8³, B=10, A=16

Handwritten calculations for Series II: 17x1, 17x3, 17x5, 17x7, 17x9, 119, 153

Q.18) Find the roots of the equation

$$p^2 - (B+6)p + A^{(3/2)} = 1$$

- A. 12 and 6
- B. 10 and 6
- C. 6 and 9
- D. 7 and 8
- ~~E. 7 and 9~~

$$p^2 - 16p + 64 - 1 = 0$$

$$p^2 - 16p + 63 = 0$$

$$-16 \quad 63$$

$$-7, -9$$

$$p = 7, 9$$

Q.19) Find the 8th term of series 'II'. 1297

- ~~A. (90A-17) 90x16-17=1440-17~~
- ~~B. (81A + 1) 81x16+1=1296+1=1297~~
- C. 84A
- D. 120B
- E. None of these



Thank You

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Quant

Topic – Profit & Loss

M -]
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= %
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Product
Q-E
No. Secs



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Profit & Loss

C.P. → Cost Price
↓
Purchase / Manufacturer

S.P. → Selling Price
↓
~~Stock~~ Sell

① Profit/Loss → CP
CP = 100%

Profit

SP > CP
SP - CP = Profit

CP = SP - Profit
SP = CP + Profit

CP = 10 ✓
SP = 15
Profit = SP - CP = 15 - 10
= 5 ✓

Profit% = $\frac{5}{10} \times 100$
= 50%

Loss
CP > SP

CP - SP = Loss

SP = CP - Loss
CP = SP + Loss

CP = 15 ✓
SP = 10 ✓
Loss = CP - SP
= 15 - 10
= 5 ✓
Loss% = $\frac{5}{15} \times 100$
= 33 1/3%



②

Relasiun btwn MRP, Discount, SP, Profit,Discount \rightarrow MRP / MP / Sale Price

① $MRP = 500 \checkmark$

$SP = 400$

$D\% = ?$

$D = 500 - 400$
 $= 100$

$D\% = \frac{100}{500} \times 100$
 $= 20\%$

$MRP - \text{Discount} = SP$

$MRP = SP + D$

$D = MRP - SP \checkmark$

Profit / Loss \rightarrow C - P

$CP + \text{Profit} = SP$

$CP - \text{Loss} = SP$



Q1.

Quantity I: Zaheer bought 320 pencils for Rs. 1600. If he sold 75% of the pencils at 20% profit and sold the remaining pencils at 40% profit, then find the overall profit earned by Zaheer?

Quantity II: If the shopkeeper sold a handbag at Rs. 1200 and he would earn a profit of 50%, then find the cost price of the handbag?

- a) Quantity I > Quantity II
- b) Quantity I ≥ Quantity II
- c) Quantity II > Quantity I
- d) Quantity II ≥ Quantity I
- e) Quantity I = Quantity II or Relation cannot be established

$$\textcircled{1} \quad 75\% (+20\%) + 25\% (+40\%) = 800$$

$$\frac{3}{4} (+20\%) + \frac{1}{4} (+40\%) \quad 1600 \times 25\% = 400$$

$$15\% + 10\% = 25\%$$

$400 < 800$

$$\textcircled{2} \quad SP = 1200 \quad P = 50\%$$

CP	SP.
100%	150%
2	3
2 × 400 = 800	1200

$$1 = \frac{1200}{3} = 400$$



Q2. There was a loss of 22% after selling an article at 40% discount. So, the shopkeeper had increased the marked price of the article by 40% but had allowed the same discount percent. If he earned Rs. 184 as profit after increasing the marked price then find the cost price of the article.

- A. Rs. 2200
- B. Rs. 2000 ✓
- C. Rs. 2100
- D. Rs. 2500
- E. Rs. 1600

$$\begin{aligned} \text{MRP} &= 100 \times 39 = 3900 \checkmark \\ \text{D} &= 40 \times 39 = 1560 \checkmark \\ \text{SP} &= 100 - 40 = 60 \times 39 \\ &= 2340 \checkmark \end{aligned}$$

$$\text{MRP} = \frac{3900 \times 140}{100} = 39 \times 140$$

$$\text{D} = 40\%$$

$$\begin{aligned} \text{SP} &= \frac{60}{100} \times 39 \times 140 \\ &= 6 \times 546 \\ &= 3276 \checkmark \end{aligned}$$

$$\text{SP} - \text{CP} = 184$$

$$3276 - 3000$$

$$276 \text{ unit} = 184$$

$$1 \text{ unit} = \frac{184 \times 2}{276 \times 3} = \frac{2}{3}$$

CP	SP
100%	78%
50	39
3000	2340

$$\frac{3000 \times 2}{3} = 2000$$



Q3. A shopkeeper sells two products A and B. He sells product A at $x\%$ profit and product B at 8% loss. The total selling price of both products is Rs. 4344 and the cost price of product A and product B are in the ratio of 4:3, respectively. If the shopkeeper had sold product A at the loss percent equal to the loss percent incurred on selling product B, then its selling price would have been Rs. 2208. Find out the value of x .

- A. 12% ✓✓
- B. 15%
- C. 14%
- D. 9%
- E. None of these

<p>A B</p> <p>+x% -8%</p> <p>CP 4 = 3</p> <p>Eq: 3x</p> <p>↓x600 ↓x600</p> <p>= 2400 1800</p>	<p>A B</p> <p>CP 4 = 3</p> <p>Eq: 3x</p> <p>↓x600 ↓x600</p> <p>= 2400 1800</p>	<p>$4x \times 92\% = 2208$</p> <p>$4x = \frac{2208}{92} \times 100$</p> <p>$25 = 2400$</p>
<p>SP(A+B) = 4344</p>		

$$2400 + \frac{2400 \times x}{100} + \frac{1800 \times 92}{100} = 4344$$

$$24x = 4344 - 2400 - 1656$$

$$= 4344 - 4056 = 288$$

$$x = \frac{288}{24} = 12$$



Q4. A mango and an orange cost Rs. 200 & Rs. 100 respectively. If the price of mango and orange is increased by 20% and 25%. And a person wants to buy 10 mangoes and 5 oranges then what is percentage change in the total amount spent by him after increase in the price.

- A. 22
- B. 25
- C. 21 ✓
- D. 26
- E. None of these

M	O	→	$200 \times 10 + 100 \times 5 = 2500$	S25
200	100			
$+20\% = 40$	$25\% = +25$			
240	125	→	$240 \times 10 + 125 \times 5 = 2400 + 625 = 3025$	

$$\frac{3025}{2500} \times 100 = \underline{\underline{21\%}}$$



Q5. Cost price of B is Rs 180 more than the Cost price of A. A is sold at profit of 20% and B is sold at loss of 40%. Ratio of selling price of A and B is 5:4. What is the cost price of A?

A. Rs. 400

B. Rs. 300 ✓

C. Rs. 360

D. Rs. 350

E. Rs. 250

$$B - A = 180$$

$$\frac{A \times 120\%}{B \times 60\%} = \frac{5}{4}$$

$$\frac{A}{B} = \frac{5}{8}$$

$\times 60 = 300$

$\times 60 = 480$

$3 = 180$
 $1 = 60$



Q6. A shopkeeper sold a wrist watch at 20% discount to Sohan and Sohan sold this watch at the profit of 12.5% profit for Rs. 2700, Then find the discount.

- A. 600
- B. 450
- C. 550
- D. 870
- E. 700

Handwritten solution:

MRP = 100

$D = -20\%$ (circled 20)

$100 \times 30 = 300$ (written below)

80

$P = 12.5\%$

$\frac{1}{8} \times 80 = 10$

$10 \times 30 = 300$ (written below)

$80 + 10 = 90$

$1 = \frac{2700}{90} = 30$ (written below)

2700 (written below)



Q7. Cost of 4 shirts and 3 trousers is Rs. 1700. If the price of a shirt is 37.5% more than the price of a trouser, then what is the difference between the price of a shirt and a trouser?

- A. 87
- B. 65
- C. 75 ✓
- D. 88
- E. 95

$$4S + 3T = 1700$$

$$\begin{aligned} S &= 37.5\% \\ &= 0.375 \\ &= \frac{3}{8} \end{aligned}$$

$$\begin{array}{c} S \quad T \\ \textcircled{11} : \textcircled{8} \\ \downarrow \quad \downarrow \\ 11 \times 4 + 3 \times 8 = 44 + 24 = 68 \\ 3 \times 25 = 75 \end{array}$$

$$\begin{aligned} 68 &= 1700 \\ 1 &= \frac{1700}{68} = 25 \end{aligned}$$



Directions (: In each of the following questions 3 statements are given. You have to determine the which statement/statements are necessary to answer the given question:

Q.8) A shopkeeper sells articles at a certain profit. Find out the amount of profit.

- A. Ratio of the selling price to the cost price of the articles is 4: 3. ~~x~~
- B. If the cost price increases by Rs 500, and selling price remains the same, the profit percentage is decrease to $13\frac{8}{9}\%$.
- C. If the marked price is kept at Rs 1000 above the cost price and a discount of 15% is given, then the profit percentage is decreased to $18\frac{3}{4}\%$.

- A. Only A and B together ✓
- ~~B. A and either B or C~~
- C. Only A and C together ✓
- D. All statements are required ✗
- E. None of these,

(A) CP SP
 $3 = 4$
 $3x \quad 4x$

(B)

(C)

A+B

CP=3x SP=4x

$3x + 500 = (3x + 500) \cdot 13\frac{8}{9}\% = 4x$

A+C

CP=3x SP=4x =

MAP=3x+1000

D=15%

SP=85%.(3x+1000)

$85\% \cdot (3x + 1000) = 4x$

Q.9) Navya buys two articles A and B at the same cost price Rs. P. Then, she marks up both articles by 75% above their cost price. Then, she sold article A at Rs. 268 discount and article B at 20% discount. Then, which of the following statement(s) is/are definitely correct :

I: The profit earned by selling article B is greater than that by article A. ~~X~~

II: Discount percent given on article A is more than that in B. ~~X~~

III: She earned equal profits by selling both the articles. ~~X~~

[a] Only I

[b] Only II

[c] Both I and II

[d] Only III

[e] ~~None of the above~~

$P = ?$

	A	B
	$CP = P$	$CP = P$
	$MRP = 1.75P$	$MRP = 1.75P$
	$D = 268$	$D = 20\%$
	$SP = 1.75P - 268$	$SP = 80\% \text{ of } 1.75P$
	$P = 1.75P - 268 - P$	$-P$
	$= 0.75P - 268$	



Q.10) The question consists of two statements numbered "I and II" given below it. You have to decide whether the data provided in the statements are sufficient to answer the question.

A shopkeeper sold an article. Find the selling price of the article.

Statement-I: The selling price of article is 45% more than the cost price of article. Marked price of article is 10% more than the selling price, and the amount of discount offered is Rs. 870.

Statement-II: Profit made by the shopkeeper is 45%. Had the article was sold for Rs. 300 more, the shopkeeper would have earned 50% profit.

[1] The data in statement I alone are sufficient to answer the question, while the data in statement II alone are not sufficient to answer the question.

[2] The data in statement II alone are sufficient to answer the question, while the data in statement I alone are not sufficient to answer the question.

[3] The data either in statement I alone or in statement II alone are sufficient to answer the question.

[4] The data given in both statements I and II together are not sufficient to answer the question.

[5] The data in both statements I and II together are necessary to answer the question.

SP=?

①

CP	SP	MRP
100	= 145	159.5

$$\text{MRP} - \text{SP} = 159.5 - 145 = 14.5 \rightarrow \times 870$$

$$1 = \frac{870}{14.5} \times 145$$

②

CP	P	SP
100x	45x	145x

$$145x + 300 = 100x + 50x$$

$$5x = 300$$

$$x = 60$$



Q11

Quantity I: Ratio of the cost price of mobile to marked price of the mobile is 4:5. If the shopkeeper offers a discount of 10% on marked price of the mobile, then what is the profit percentage of the mobile?

Quantity II: The selling price of the laptop is 20% more than the cost price of the laptop. If the marked price of the laptop is 40% more than the cost price of the laptop, then find the discount percentage offered on laptop?

- A. Quantity I > Quantity II
 B. Quantity I ≥ Quantity II
 C. Quantity II > Quantity I
 D. Quantity II ≥ Quantity I
 E. Quantity I = Quantity II or Relation cannot be established

①

CP	MRP	D	SP
4	5	.5	4.5

$$P = \frac{.5}{4.5} \times 100 = 12.5\%$$

②

CP	SP	MRP
100	120	140

$$D = 140 - 120 = 20$$

$$D\% = \frac{20}{140} \times 100 = 14\frac{2}{7}\%$$



Q12

Quantity I: The market price of the watch is Rs.720. A man brought the same for Rs.550.80 after getting two successive discounts, the first being 10%, the second discount is?

Quantity II: The listed price of a shirt is Rs.270 and it is available at 237.60. The rate of discount is?

- A. Quantity I > Quantity II
- B. Quantity I \geq Quantity II
- C. Quantity II > Quantity I
- D. Quantity II \geq Quantity I
- E. Quantity I = Quantity II or Relation cannot be established.

Home Work



Q13. What is the selling price of the article?

Statement I: The marked price of the article is 20% more than the cost price of the article and the shopkeeper offers the discount of 15%. **X**

Statement II: Ratio of the cost to marked price of the article is 5:6 and the shopkeeper gets the profit of Rs.80. **X**

- A. The data in statement I alone is sufficient to answer the question, while the data in statement II alone is not sufficient to answer the question
- B. The data in statement II alone is sufficient to answer the question, while the data in statement I alone is not sufficient to answer the question
- C. The data either in statement I alone or in statement II alone is sufficient to answer the question
- D. The data given in both statements I and II together are not sufficient to answer the question
- E. The data given in both statements I and II together are necessary to answer the question.

SP = ?

①

CP	MRP	D	SP
100	120	15% = 18	102
5 = 6			102 × 40

②

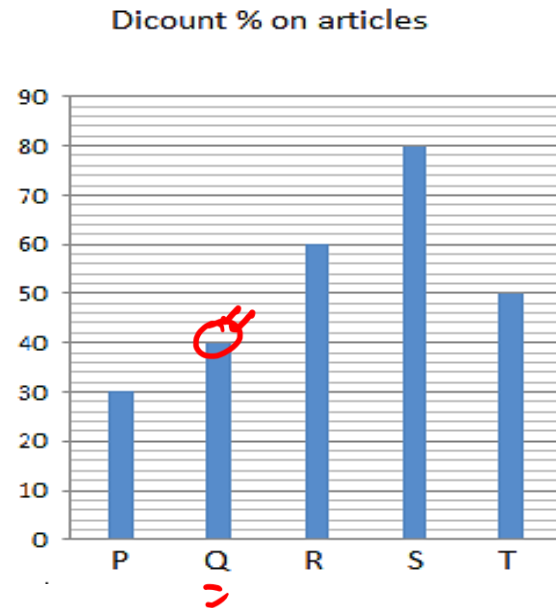
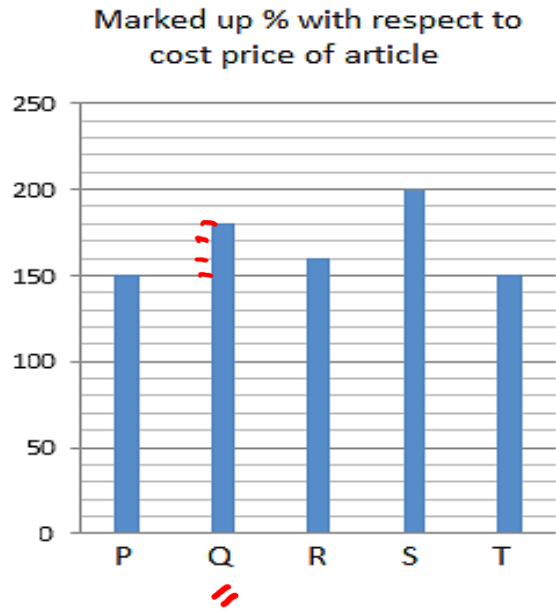
CP	MRP	P = 80
5 = 6		
10 = 12		

① + ②

2 = 80
1 = 40



The first bar graph shows the marked up price of articles with respect to their cost price and the second bar graph shows the discount % given in respective articles.



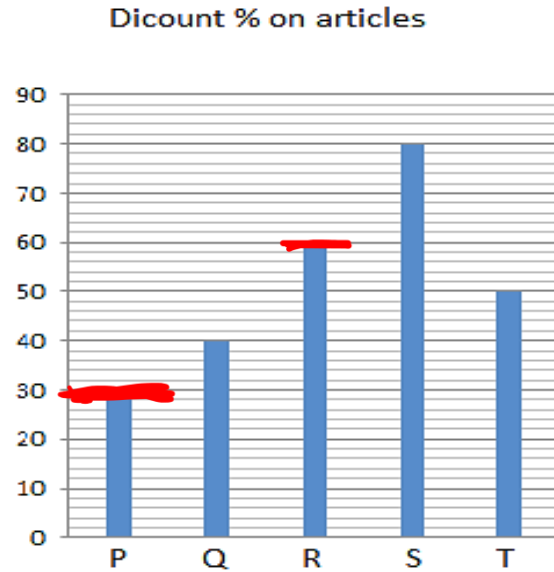
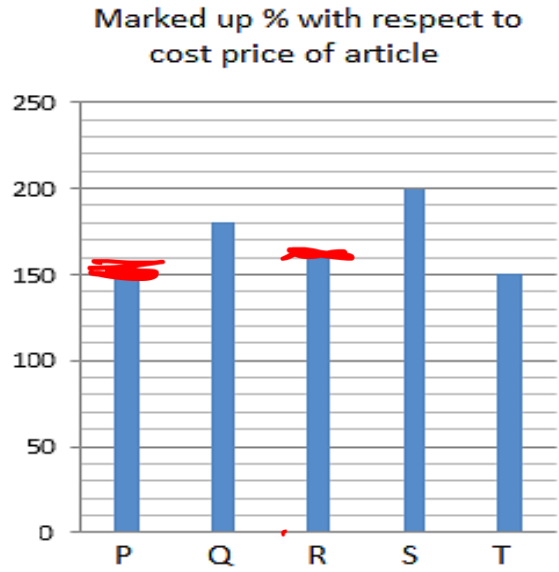
Q14. If the cost price of Q is decreased by 10% (other prices remaining same), then what is the different between the new profit% and original one?

- A) 15%
- B) 10%
- ~~C) 12%~~
- D) 9%
- E) Cannot be determined

$Q = CP = 100$
 $MRP = 180$ (8%)
 $D = 40\% = 72$
 $SP = 180 - 72 = 108$
 $CP = 90$
 $SP = 108$
 $P = 108 - 90 = 18$
 $P\% = \frac{18}{90} \times 100 = 20\%$



The first bar graph shows the marked up price of articles with respect to their cost price and the second bar graph shows the discount % given in respective articles.



Q15. Cost price of P is 10% more than the cost price of R. If selling price of R is Rs 320 find the selling price of P.

- A) Rs 548.5
- ~~B) Rs 577.5~~
- C) Rs 532.5
- D) Rs 553.5
- E) Cannot be determined

(R) $CP = 100 \times 5 = 500$
 $MRP = 160$
 $D = 60\% = 96$
 $SP = 160 - 96 = 64 \rightarrow 320$
 $\times 5$

(P) $CP = 500 + 50 = 550$

$\frac{825 \times 7}{10} = \underline{\underline{577.5}}$
 $\left(\frac{550 \times 150}{100} \right) \times \frac{70}{100}$



Study the following information carefully and answer the given questions. The table below shows cost price and selling price of 6 different articles sold by a shopkeeper:

Articles	Cost Price	Selling Price	Cost of Transport	Profit %	Loss %
P	4500		120		
Q		5500		10%	
R	6000				20%
S			500		12%
T	8000			15%	
U		12000			25%

Note: Total cost price of article = Cost price + Cost of transportation

Q.16) If the cost price of article S is 20% more than the cost price of Article T then find the selling price of article S?

- A. Rs. 2050
- B. Rs. 4450
- ~~C. Rs. 8888~~
- D. Rs. 9000
- E. Rs. 5000

②

$$CP = 8000 + 1600 = 9600 + 500 = 10100$$

$$\frac{88}{100} \times 10100 = 8888$$



Study the following information carefully and answer the given questions. The table below shows cost price and selling price of 6 different articles sold by a shopkeeper:

Articles	Cost Price	Selling Price	Cost of Transport	Profit %	Loss %
P	4500		120		
Q		5500		10%	
R	6000				20%
S			500		12%
T	8000			15%	
U		12000			25%

Note: Total cost price of article = Cost price + Cost of transportation

Q.17) If the shopkeeper has paid Rs. x for the cost of transport in article R and when the transportation cost increases by Rs. 100, then find the value of x if the sum of selling prices of article R in these two cases is 11000?

- A. Rs. 203
- B. Rs. 665
- C. Rs. 527
- D. Rs. 400
- E. Rs. 825

Home work



Q.18) A man bought two bats and 6 identical balls, he sold all of them in a day, calculate his overall profit %.

(I) He sold one bat at a price of Rs. 600 and other at Rs. 420 and profit is 20% on both bats. Each ball is sold at 12% profit.

(II) Profit earned from 6 balls is Rs. 36 and profit earned from both bats is Rs. 170.

(III) Profit earned on each bat is 20% while cost price of each ball is Rs. 50.

[1] Any one of them

[2] Only I and II together are sufficient

[3] Any two of the three together are sufficient

[4] None of the above

[5] All three together are sufficient

Home Work

Q. 12, 17, 18



Q.19) An article is marked up at a certain rate above the cost price. Find the marked price of the article (i.e) Rs. K.

Statement I. K is marked at 80% above cost price.

Statement II: The cost price of the article is Rs. P. If the shopkeeper gives a discount of 4%, then he makes a profit of 8%. If he sells the article at the marked price, then profit is Rs. 28

Statement III: The cost price of the Pen is Rs. Q. Shopkeeper makes a profit of Rs. 56, if he gives a discount of 22.22%

[1] II or (I + III)

[2] Only II

[3] Combination of any two statements

[4] Only III

[5] Any of the statements alone is not sufficient to answer the question.

CP MRP (K)
 $100 = 180$
 P

CP = MRP
 $100 - D = 100 + P$
 $100 - 4 = 100 + 8$
 $96 = 108$
 $8 = 9$
 $1 = 28$
 P ~ 8 = 9 ~ K

$3x + 4y = 56$

$K = Q + 56$



Q.20) Marked price of an article is 60% more than the CP of the article. When it is sold at x% discount then _____% profit is obtained and when it is sold at a discount of 2x%, _____% profit is obtained. Which of the following options are possible for the blanks in same order.

- A. 60, 30 ~~X~~
- B. 20, 8 ~~X~~
- C. 48, 24
- D. 36, 12
- E. 44, 28

- [1] A and E ~~X~~
- [2] B, D and E ~~X~~
- [3] C, D and E ✓
- [4] All are possible ~~X~~
- [5] A, D and E ~~X~~

Handwritten calculations and diagrams:

$CP = 100$, $MRP = 160$
 $S = 8$

$CP = 100 - D$, $MRP = 100 + P$
 $100 - x\% = 100 + P$
 $100 - 2x\% = 100 + P$

$100 - x = 100 + 60 = 160$
 $\frac{100}{160} = \frac{100 - x}{160}$
 $100 - x = 100$

$100 - x = 100 + 44$
 $90 = 144$
 $\frac{90}{144} = \frac{100 - x}{144}$
 $5 = 8$

$100 - 20 = 100 + 28$
 $80 = 128$
 $\frac{80}{128} = \frac{100 - 20}{128}$
 $5 = 8$

$100 - 50 = 100 + 8$
 $50 = 108$

75 $\frac{75}{100} = \frac{100 - x}{100}$
 $100 - x = 120$
 $S = 8$

18 $\frac{18}{90} = \frac{100 - x}{90}$
 $100 - x = 180$
 $S = 8$



Thank You

Practice

Home Wks

Q, 12, 17, 18

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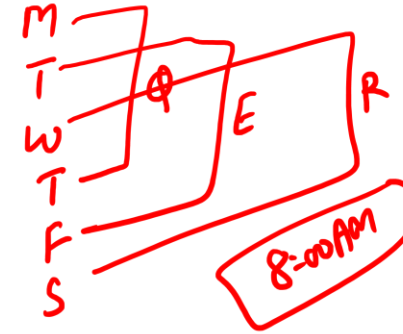


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RBI Grade A/B 2025

QRE 360°

Quant



Topic – Simple Interest

%
Rate
Prnt
QE
No. of
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Investment = Principal = 100%

Interest
↓
Benefit
=

100 = 10

Time
↓
Sec.
mint
Hours
day
week
Month ✓
Year ✓

Rate → 10% (Annum)

$\frac{\text{Benefit}}{\text{Investment}} = \frac{SI}{P}$ in a Particular time

20% (Quarterly) =

5% (Half yearly)



Intaent

Simple
=

$$SI = \begin{array}{l} \textcircled{1} 1000 \xrightarrow{10\%} 100 \\ \textcircled{2} 1000 \xrightarrow{10\%} 100 \\ \textcircled{3} 1000 \xrightarrow{10\%} 100 \\ \hline 300 \end{array}$$

$P = 1000$
Rate = 10% / Annum
Time = 3 Year.

Compound

$$CI = \begin{array}{l} \textcircled{1} 1000 \xrightarrow{10\%} 100 \checkmark \\ \textcircled{2} 1100 \xrightarrow{10\%} 110 \checkmark \\ \textcircled{3} 1210 \xrightarrow{10\%} 121 \checkmark \\ \hline 331 \end{array}$$



Simple Interest

$$SI = \frac{P \times R \times T}{100}$$

$$P = 5000$$

$$\text{Rate} = 20\% \text{ / Annum } \checkmark$$

$$\text{Time} = 2 \text{ years } 3 \text{ months } \checkmark$$

$$SI = ?$$

$$2 \frac{3}{4} = \frac{9}{4} \text{ year}$$

$$SI = \frac{P \times R \times T}{100}$$

$$= \frac{5000 \times 20 \times 9}{100 \times 4}$$

$$= 2250$$

$$2 \times 20\% = 40\%$$

$$\frac{1}{4} \times 20\% = 5\%$$

$$\underline{\underline{45\%}}$$

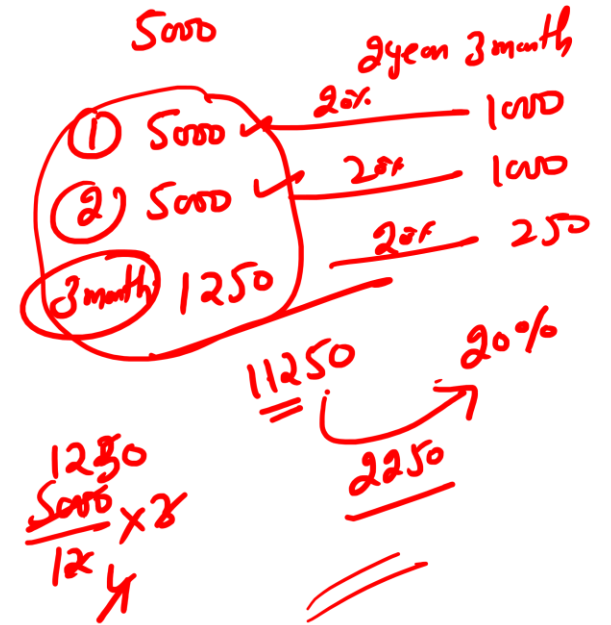
$$P = 100\%$$

$$\text{Rate} = 20\% \text{ / Annum}$$

	SI	P
1 year	20%	100%
	1000	5000

2 year 3 month	
↓	$\frac{1000 \times 250}{12}$
2000	↓

$$= \underline{\underline{2250}}$$



Q1. Satish invested some amount at the rate of 12% simple interest and a certain amount at the rate of 10% simple interest and he received total interest of Rs 3830 for one year. If he had interchanged the amount invested, he would have received Rs 40 more as total interest. How much did he invest at 12% simple interest initially?

- A. Rs. 16500 ✓
- B. Rs. 15600
- C. Rs. 17200
- D. Rs. 12400
- E. None of these

x	y	y	x	$x+y = 35000$
12%	10%	12%	10%	
16500				

$$12\% \cdot x + 10\% \cdot y = 3830$$

$$12\% \cdot y + 10\% \cdot x = 3870$$

$$22\% \cdot x + 22\% \cdot y = 7700$$

$$22 \cdot (x+y) = 7700$$

$$x+y = \frac{7700}{22} = 35000$$

$$10\% \cdot x + 2\% \cdot x + 10\% \cdot y = 3830$$

$$10\% \cdot (x+y) + 2\% \cdot x = 3830$$

$$35000 + 2\% \cdot x = 3830$$

$$2\% \cdot x = 3830 - 35000$$

$$2\% \cdot x = 330$$

$$x = \frac{330}{2} \times 100 = 16500$$



Q2. If Rs. 780 is obtained as SI after lending out Rs. x at 13% per annum for 3 years and Rs. 1020 is obtained after lending out Rs. y at 17% per annum for 2 years, then find the simple interest obtained on $(x + y)$ for 6 years at 7% per annum.

- A. 2500
- B. 2800
- C. 2010
- D. 2100 ✓✓
- E. 2001

$$780 = x \times 13\% \times 3$$

$$1020 = y \times 17\% \times 2$$

$$SI = \frac{P \times R \times T}{100}$$

$$39\% \text{ of } x = 780$$

$$y = \frac{1020 \times 100}{34}$$

$$x = \frac{780}{39} \times 100$$

$$y = 3000$$

$$x = 2000$$

$$x + y = 5000$$

$$7\% \text{ for } 6 \text{ years}$$

$$= 350 \times 6 = 2100$$



Q3. Rahul invests Rs.5000 at simple interest at 18% per annum for x years and Rajesh invests Rs.8000 at simple interest at 12% per annum for $(x + 2)$ years. If the difference between the interest received by Rahul and Rajesh is Rs.2400, then find the value of x ?

- A.6
- B.8 ✓
- C.10
- D.12
- E. None of these

Rahul	Rajesh
$5000 =$	$8000 =$
↓	↓
18%	12%
↓	↓
x year	$(x+2)$
$900 \times x$	$(960)(x+2)$
$1920 + 960x - 900x = 2400$	
$60x = 480$	
$x = 8$	



Q4. A took Rs.5000 from bank at the rate of simple interest. After 72 months, A paid Rs.8300 to bank and then B took Rs.3000 from bank at the same rate of simple interest for 36 months. What is the total amount paid by B to bank?

- A. Rs.5900
- B. Rs.4840
- C. Rs.3990 ✓✓
- D. Rs.2870
- E. None of these

$$S_{0000} \text{ ——— } 8300$$

$$SI = 8300 - 5000 = 3300$$

$$T = \frac{72 \text{ months}}{12} = 6 \text{ years}$$

$$SI \% = \frac{3300}{5000} \times 100 = 66\%$$

$$\text{Rate} = \frac{66\%}{6} = 11\% \text{ / Annum}$$

$$3000 \checkmark$$

$$T = \frac{36 \text{ m}}{12} = 3 \text{ years}$$

$$11\% = 330 \times 3$$

$$= 990$$

$$\underline{\underline{3990}}$$



Q5. How much time will it take for an amount of 900/- to yield 81/- as interest at 4.5% per annum of simple interest?

- A. 2 years ✓✓
- B. 3 years
- C. 1 years
- D. 4 years
- E. 5 years

$$\frac{81}{900} \times 100 = 9\%$$

$$\frac{9\%}{4.5\%} = \underline{\underline{2 \text{ years}}}$$



Q6. Ravi borrowed sum of Rs. 6300 from Neha at the rate of 14% per annum for 3 years. He added some more money in it and lent it to Aarju at 16% per annum for 3 years. In this process he earns a total profit of Rs. 618. Find how much amount does he added?

- 1) Rs. 300
- 2) Rs. 400
- ~~3) Rs. 500~~
- 4) Rs. 600

Handwritten solution:

Neha \rightarrow Ravi \rightarrow Aarju

\downarrow
 6300
 14%
 3 year ✓

\downarrow
6300 + x
 16%
 3 year

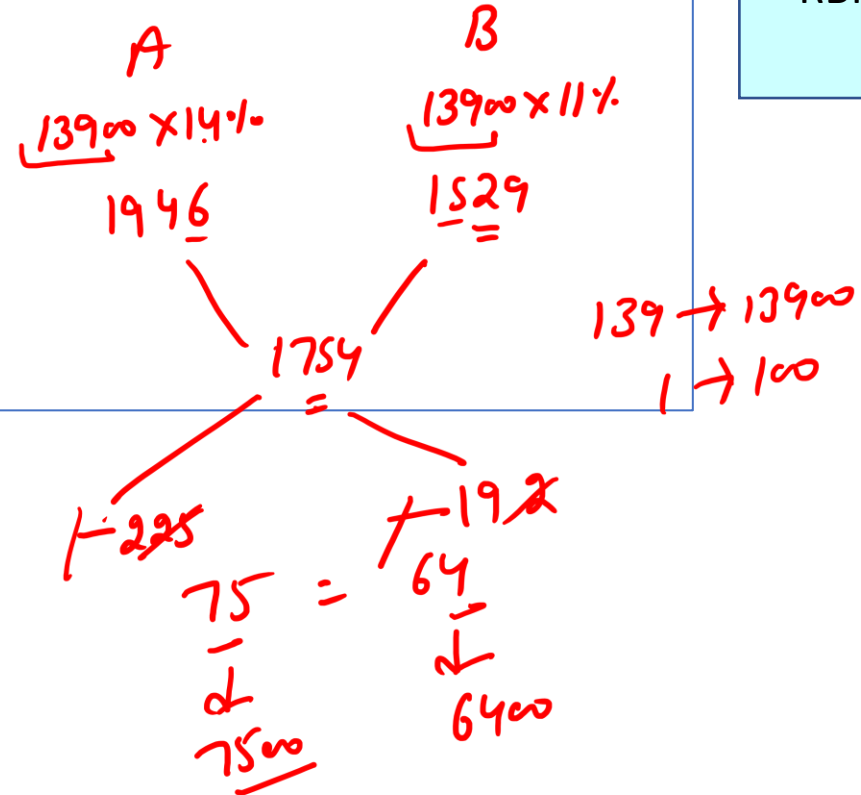
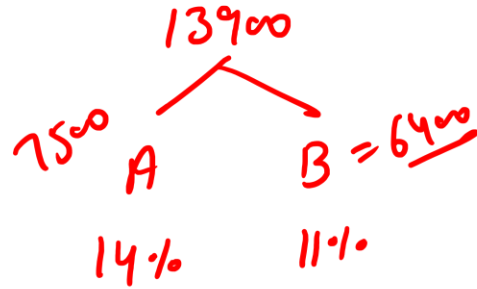
Ravi Profit = 618
 \downarrow
 6300 + x
 $(16\% - 14\%) = 2\%$
 $= 126 \times 3 = 378$

$48\% \text{ of } x + 378 = 618$
 $48\% \text{ of } x = 240$
 $x = \frac{240}{48} \times 100 = \underline{\underline{500}}$



Q7. Mr. Thomas invested an amount of 13,900/- divided in two different schemes A and B at the simple interest rate of 14% p.a. and 11% p.a. respectively. If the total amount of simple interest earned in 2 years be 3,508/- what was the amount invested in Scheme B?

- A. 6,400/- ✓
- B. 7,200/-
- C. 6,500/-
- D. 7,500/-
- E. 7,000/-



$$14\% \cdot A + 11\% \cdot B = \frac{3508}{2} = 1754$$

$$11\% \cdot (A+B) + 3\% \cdot A = 1754$$

$$\downarrow$$

$$13900$$

$$3\% \cdot A = 1754 - 1529$$

$$= 225$$

$$A = \frac{225}{3} \times 100$$

$$= 7500$$



Q8. The simple interest on Rs. 28000 for _____ years at 12 % per annum is Rs. _____. Which of the following option satisfies the given condition?

- I) 3, 10080 ✓
- II) 4, 13440 ✓
- III) 2, 6720 ✓

- a) Only I
- b) Only II
- c) Only III
- d) Both I and II
- ~~e) All I, II and III~~

P	T	Rate	SI
28000	—	12% Annun	—
		$28000 \times 12\%$	
		= 3360	
			$3 \times 3360 = 10080$
			$4 \times 3360 = 13440$
			$2 \times 3360 = 6720$ —



Q9. Akash borrowed Rs 12000 from a bank at the rate of 6% for 8 years. After a certain period of time, the government introduced a scheme which reduced the interest rate by 3%. At the end of 8 years, Akash paid Rs 16680 in total then after how much time the government introduced the scheme?

- A. 6
- B. 5 ✓
- C. 2
- D. 3
- E. None of these.

Handwritten solution:

$12000 \times 6\% \times 8 = 720$
 $720 \times 8 = 5760$
 $5760 - 4680 = 1080$

$16680 - 12000 = 4680$
 $SI = 4680$
+ 5 years

$12000 \times 3\% = 360$
 $\frac{1080}{360} = 3 \text{ years}$ (Benefit)



Q10. Shyam invests Rs. ----- at simple interest rate 15% per annum, Rs.50400 is obtained as interest in x years. Surya earns Rs.16800 as interest on Rs.20000 in the same x years at the rate of ----%.

- a) 32000, 8
- b) 24000, 5
- c) 28000, 7
- d) Either a or c
- e) None of these

Home Work

↓
Comment



Q11. Quantity I: Ram borrowed the money from Prem at the rate of 12% per annum simple interest. Then Ram deposited that money in the bank at 20% simple interest. At the end of 18 years, Ram earned the profit of Rs. 540. Find the Sum?

Quantity II: The difference between CI and SI of a particular amount on 2 years at 5% per annum is rs. 15 respectively. Find the sum?

Quantity III: A and B started the business by investing Rs. 4000 and Rs. 2000 respectively. After six months A withdrew Rs. 800. The total profit at the end of a year is Rs. 2800, then find the profit share of B?

- a) <, <
- b) <, >
- c) >, >
- d) =, <
- e) =, >

Home Work
↓
Comment



Q12. A person invested Rs. 40000 at the rate of 5R% per annum simple interest for R years and received Rs. 18000 as interest.

Quantity I: Find the compound interest received after 2 years, if he had invested Rs. 30000 at the (R+7) % per annum compounded annually.

Quantity II: If Rs. 8000R is invested at the rate of 18% per annum simple interest, then interest received after 4 years.

- A. Quantity I > Quantity II
- ~~B. Quantity I < Quantity II~~
- C. Quantity I ≥ Quantity II
- D. Quantity I ≤ Quantity II
- E. Quantity I = Quantity II

$$\frac{18000}{40000} \times 100 = 5R\% \times R$$

$$= 5R^2$$

$$5R^2 = 45$$

$$R = 3$$

$$SR\% = 15\%$$

$$\downarrow +7$$

$$22\%$$

① 30000

① $6600 = 6600$

② $6600 + 1452 = 8052$

14652

$$8000 \times 3 = 24000$$

$$\downarrow 18\% = 4320 =$$

$$\times 4$$

17280

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QRE 360°

Quant =

Topic – Compound Interest

M
|
S

8:00 AM
M-T

%
Rate
No.
Q.L
Pr
P+L
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Compound Interest

$P = 10000$
 Rate = 10% Annam
 Time = 3 years

$$\begin{aligned}
 \text{Amount} &= P \left[1 + \frac{R}{100} \right]^T \\
 &= 10000 \left[1 + \frac{10}{100} \right]^3 \\
 &= 10000 \times \frac{11}{10} \times \frac{11}{10} \times \frac{11}{10} \\
 &= 13310 \\
 \text{CI} &= 13310 - 10000 \\
 &= 3310
 \end{aligned}$$

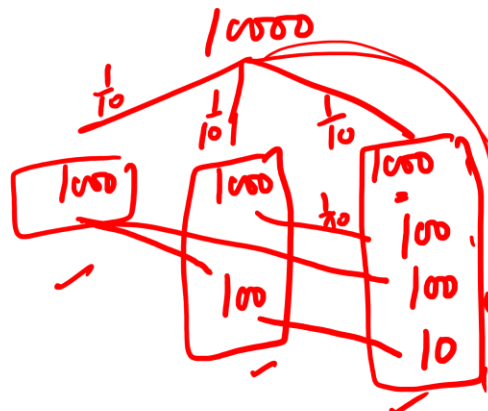
②

Tree Method

$T = 3 \text{ yr}$

$P = 10000$

$R = 10\% = \frac{10}{100} = \frac{1}{10}$



$$\begin{aligned}
 10000 + 1100 + 1210 \\
 = 3310
 \end{aligned}$$

③

Line Method

$P = 10000$

$R = \frac{1}{10}$

$\frac{1}{10}$ ① 10000

$\frac{1}{10}$ ② $10000 + 1000 = 11000$

$\frac{1}{10}$ ③ $11000 + 1100 = 12100$

$\frac{1}{10}$ ④ $12100 + 1210 = 13310$

⑤ $13310 + 1331 =$

④

Ratio Method

Rate = $\frac{1}{10}$

	P	A
1 year	10	11
3 years	10^3	11^3
	10000	13310
	$\downarrow \times 10$	$\downarrow \times 10$
	100000	133100
	\uparrow	\uparrow
	3310	3310



Q12. A person invested Rs. 40000 at the rate of 5R% per annum simple interest for R years and received Rs. 18000 as interest.

Quantity I: Find the compound interest received after 2 years, if he had invested Rs. 30000 at the (R+7)% per annum compounded annually.

Quantity II: If Rs. 8000R is invested at the rate of 18% per annum simple interest, then interest received after 4 years.

- A. Quantity I > Quantity II
- ~~B. Quantity I < Quantity II~~
- C. Quantity I ≥ Quantity II
- D. Quantity I ≤ Quantity II
- E. Quantity I = Quantity II

$$\frac{18000}{40000} \times 100 = 5R\% \times R$$

$$= 5R^2$$

$$5R^2 = 45$$

$$R = 3$$

$$R + 7$$

$$5R\% = 15\%$$

$$\downarrow +7$$

$$22\%$$

① 30000

① 6600 = 6600

② 6600 + 1452 = 8052

14652

14652 ✓

$$8000 \times 3 = 24000$$

$$\downarrow 18\% = 4320$$

$$\times 4$$

17280 ✓



$$P = 64000$$

$$\text{Rate} = 25\% \text{ Annum} = \frac{25\%}{2} = 12.5\% \text{ Half Year} = \frac{1}{8}$$

$$\text{Time} = 1 \text{ year } 6 \text{ months} = 3 \text{ half Year}$$

CI half yearly
CI = ?

- 64000
- $\frac{1}{8}$ (1) 8000 ✓
- $\frac{1}{8}$ (2) 8000 + 1000 = 9000 ✓
- $\frac{1}{8}$ (3) 9000 + 1125 = 10125 ✓
- (4)
- (5)
- |
- |



$$P = 2500$$

Rate Int y_{en} = 10% = $\frac{1}{10}$
And y_n = 20% = $\frac{1}{5}$

$$P = 2500$$

$$\frac{1}{10} \text{ (1) } 250$$

$$\frac{1}{5} \text{ (2) } 500 + 50 = 550$$

$$\text{2yr CI} = 250 + 550 \\ = 800$$

$$\text{2yr SI} = 250 + 50 \\ = 750$$



$$2\text{yr CI} - 2\text{yr SI} = \text{diff} = 4.5$$

Rate $\rightarrow 12.5\% / \text{Annum}$

$$\text{Sum} = \frac{\text{diff} \times 100^2}{\text{Rate}^2}$$

$$= \frac{4.5 \times 100^2 \times 100}{12.5 \times 12.5 \times 100}$$
$$= \underline{\underline{288}}$$

$$3\text{yr CI} - 3\text{yr SI} = \text{diff}$$

Rate

$$\text{Sum} = \frac{\text{diff} \times 100^3}{R^2 [300 + R]}$$



(1) Line Method

(2) Ratio Method

(3) diff

$$2Y_2CI - 2Y_1SI = d_1Y$$

$$\text{Sum} = \frac{d_1Y \times \omega^2}{R^2}$$

$$3Y_2CI - 3Y_1SI = d_1Y$$

$$\text{Sum} = \frac{d_1Y \times \omega^3}{R^2 [3\omega + R]}$$



Q1. The compound interest on Rs. 2800 for 1 year 6 months at 10% p.a. is.

- 1) 441.35
- 2) 436.75
- 3) 434 ✓
- 4) 420

$\frac{1}{10}$

$$P = 2800$$

$$\frac{1}{10} \text{ (1) } 280$$

$$\frac{1}{10} \text{ (2) } 280 + 28 = 308$$

1 Year 6 month
 $280 + \frac{308 \times 6}{12} = 434$



Q2. The difference between compound interest and simple interest on a certain sum at 8% per annum for 2 years is Rs240. Find the sum.

- 1) 37500 ✓
- 2) 35000
- 3) 32000
- 4) 30000

$$\begin{aligned} \text{Sum} &= \frac{\text{diff} \times 100^2}{R^2} \\ &= \frac{240 \times 100 \times 100}{8 \times 8} \\ &= \underline{\underline{37500}} \end{aligned}$$

(b) →
(2) ✓



Q3. Find the compound interest on Rs. 8000 at 5% p.a. for 3 years.?

- 1) Rs. 1250
- 2) Rs. 1261 ✓
- 3) Rs. 1241
- 4) Rs. 1271

$$\downarrow$$
$$\frac{1}{20}$$

$$P = 8000$$

$$\frac{1}{20} \text{ (1) } 400 \quad \checkmark$$
$$\frac{1}{20} \text{ (2) } 400 + 20 = 420 \quad \checkmark$$
$$\frac{1}{20} \text{ (3) } 420 + 21 = 441 \quad \checkmark$$
$$\underline{\underline{1261}}$$



Q4. The difference between simple interest and compound interest on a certain sum of money for 3 years at 10% p.a. is Rs. 15.50. The sum is

- 1) 5000
- 2) 3000
- 3) 550
- 4) 500 ✓

$$\begin{aligned} \text{Sum} &= \frac{\text{diff} \times 100^3}{R^2 [300 + R]} \\ &= \frac{15.5 \times 100 \times 100 \times 100}{10^2 \times 310 \times 10} = 500 \end{aligned}$$



Q5. The simple interest on a sum of money for 5 years is Rs 2000 at 15% p.a. Find the compound interest on the same sum of money at same rate for 3 years.

- 1) 1286
- 2) 1389 ✓
- 3) 1550
- 4) 1440

$S_{yr} \rightarrow 2000$
 $1yr \rightarrow \frac{2000}{5} = 400$
 $15\% = \frac{3}{20}$

$P \times \frac{3}{20} = 400$
 $P = \frac{400 \times 20}{3}$

$400 \times \frac{3}{20}$
 (1) 400 ✓
 $400 + 60 = 460$ ✓
 $460 + 69 = 529$ ✓
1389



Q6. A man borrows Rs. 3000 at 10% compound rate of interest. At the end of each year he pays back Rs. 1000. How much amount should he pay at the end of the third year to clear all his dues?

- 1) 1294
- 2) 1683 ✓✓
- 3) 1495
- 4) 1193

$$3000 \xrightarrow[300]{10\%} 3300 - 1000$$

$$2300 \xrightarrow[230]{10\%} 2530 - 1000$$

$$1530 \xrightarrow[153]{10\%} \boxed{1683}$$

SI

$$3000 \xrightarrow[300]{10\%} 3000 - 1000$$

$$2000 \xrightarrow[200]{10\%} 2000 - 1000$$

$$\textcircled{1000} \xrightarrow[100]{10\%} 1000 + 600 = \textcircled{1600}$$



Q7. Mohan invested Rs. _____ on simple interest at 8% per annum for 5 years on scheme X. He invested Rs. 75000 on compound interest at 12% per annum for two years on scheme Y. Difference between the total amount got by him from scheme X and scheme Y is Rs. _____. Which of the following options satisfy the given condition?

- I. 40000, 38080 ✓✓
 - II. 55000, 17080 ✓✓
 - III. 60000, 15000 X
- a) Both I and II
 b) Both II and III
 c) Both I and III
 d) All I, II and III
 e) Only III

(X)
 $P = \text{---}$
 $R = 8\%$
 $T = 5 \text{ years}$
 $\left. \begin{matrix} R \\ T \end{matrix} \right\} 40\%$
 $\text{Amount} = 140\%$

(Y)
 $P = 75000$
 12% ① 9080
 12% ② $9000 + 1080 = 10080$
 $\left. \begin{matrix} 12\% \\ 12\% \end{matrix} \right\} 19080$
 $\text{Amount} = 75000 + 19080 = 94080$ ✓✓

$40000 \times 140\% = 56000$
 $55000 \times 140\% = 77000$
 $60000 \times 140\% = 84000$

$94080 - 56000 = 38080$
 $94080 - 77000 = 17080$
 10080



Q8. The difference between Simple interest and Compound interest on a certain sum at the rate of ___% per annum for two years is Rs. _____. The simple interest on the same sum at the rate of 15% per annum for 5 years is Rs. 33750?

Which of the following options satisfy the given condition?

- I) 12, 648 ✓
- II) 10, 450 ✓
- III) 15, 956
- a) Only I
- b) Only II
- c) Only III
- d) Both I and II ✓✓
- e) Both II and III

Handwritten solution:

$$S \times 15\% = 75\%$$

$$75\% = 33750$$

$$100\% = \frac{11250}{75} \times 100 = 45000$$

$$S_{diff} = \frac{diff \times 100^2}{R^2} = 100\%$$

$$\textcircled{1} \frac{648 \times 100 \times 100}{12 \times 12} = 45000$$

$$\textcircled{2} \frac{450 \times 100 \times 100}{100} = 45000$$

45000 =



Q9. The compound interest on a certain sum for _____ year/years at 10% per annum is Rs. _____. Then the simple interest for the same sum on 2 years at 10 % per annum is Rs. 6000.

Which of the following option satisfies the given condition?

I) 2, 6300 ✓

II) 3, 9930 ✓

III) 1, 3000 ✓

a) Only I and II

b) Only II and III

c) Only I and III

d) Only II

e) All I, II and III ✓✓

$$P = 30000$$

$$10\% \text{ (I) } 3000 \checkmark$$

$$10\% \text{ (II) } 3000 + 300 = 3300 \checkmark$$

$$10\% \text{ (III) } 3300 + 330 = 3630$$

$$2 \times 10\% = 20\% = 6000$$

$$100\% = 30000$$



A person invested different amount in different years at different rate of interest for different years as described in below table. Some values are missing. Answer the questions on the basis of given table and information in question.

I = Interest received after 1 year

Year	Interest Type	Principal	Rate%	Time in Years	I
2012	Simple/ Compound	Rs. 15000	6%/5%	5/---	---
2013	Compound	Rs. 25000	4%	---	---
2014	Compound	---	---	2	Rs. 800
2015	Simple	Rs. 25000	---	8	Rs. 1750
2016	Simple	---	---	6	Rs. 2800

Q10. In 2014, the difference between compound interest and simple interest for the given period is Rs 40. If the sum is invested for 3 years, what will be the compound interest after 3 years?

- A) Rs 2728
- B) Rs 2655
- C) Rs 2328
- ~~D) Rs 2522~~
- E) Rs 2544

$$\frac{1}{20} \text{ (1) } 800$$

$$\frac{1}{20} \text{ (2) } 800 + 40 = 840$$

$$\frac{1}{20} \text{ (3) } 840 + 42 = 882$$

$$\underline{\underline{2522}}$$

$$\frac{40}{800} = \frac{1}{20}$$

A person invested different amount in different years at different rate of interest for different years as described in below table. Some values are missing. Answer the questions on the basis of given table and information in question.

I = Interest received after 1 year

Year	Interest Type	Principal	Rate%	Time in Years	I
2012	Simple/ Compound	Rs. 15000	6%/5%	5/---	---
2013	Compound	Rs. 25000	4%	---	---
2014	Compound	---	---	2	Rs. 800
2015	Simple	Rs. 25000	---	8	Rs. 1750
2016	Simple	---	---	6	Rs. 2800

Q11. In 2015, if rate of interest is increased by 3%, what will be the amount received after given period?

- A) Rs 52,000
- ~~B) Rs 45,000~~
- C) Rs 42,000
- D) Rs 47,000
- E) Rs 54,000

Handwritten solution:

25000 \times 3% = 750

1750 + 750 = 2500 \times 8 = 20000

Q.12) Ajay invested Rs. 'x' in a scheme Z. Scheme Z offers compound interest at the rate 10% compounded annually for the first three years and then simple interest at the rate 8% for the next five years. Find the value of 'x', if the total interest earned by Ajay after eight years is Rs. 34,536?

- A. Rs. 45000
- B. Rs. 36000
- C. Rs. 48000
- D. Rs. 36000
- E. Rs. 40000 ✓✓

$$P = x = 10000$$

$$10\% = \frac{1}{10}$$

$$\frac{1}{10} \text{ (1) } 100$$

$$\frac{1}{10} \text{ (2) } 100 + 10 = 110$$

$$\text{(3) } 110 + 11 = 121$$

$$34\% \text{ CI} \rightarrow \underline{\underline{331}}$$

$$1331$$



$$SI = 8\% \times 5 = 40\% = \frac{40}{100} \times 1331$$

$$= 532.4$$

$$331 + 532.4 \rightarrow 34536$$

$$863.4 \rightarrow 34536$$

$$100 \rightarrow \frac{34536}{863.4} \times 10000$$

$$= \underline{\underline{40000}}$$



Q.13) Rs. 13000 was invested for 2 years in scheme A which offers compound interest, and the rate of interest ___% per annum. The amount received after 2 years from scheme A is Rs. 15,730. What approximate amount is received on investing the amount obtained from scheme A again in a different scheme B for 2 years where the interest rate of scheme B is twice the rate of interest of scheme A?

- I. 10%, Rs 22,651 ✓
 - II. 12%, Rs 23,784
 - III. 15%, Rs 26,584
- [a] Only I
[b] Only II
[c] Only I and II
[d] Only I and III
[e] All I, II and III

A

13000 A = 15730

2yⁿ

CI

R = ?

$\left(\begin{array}{l} \times \frac{1}{2} \\ 1y^{\frac{n}{2}} \end{array} \right)$

$100 : 121$
 $100^{\frac{1}{2}} : 121^{\frac{1}{2}}$
 $10 : 11$
 $\frac{1}{10} \times 100$
 $= 10\%$

B

P = 15730 15730

T = 2yⁿ $\frac{1}{5}$ (1)

R = $\frac{1}{10} \times 2 = \frac{1}{5}$ $\frac{1}{5}$ (2)



Q.14) Arun invested a certain sum of money at a rate of interest % for years. If the ratio of the amount to interest is 216:91. Then find the rate of interest and time for which Arun invested the money.

I: 10%, 2 years ~~X~~

II: 20%, 3 years ✓✓

III: 25%, 3 years

[a] Only I

[b] Only II ✓✓

[c] Both I and II

[d] Both II and III

[e] All I, II and III

$$\begin{array}{l} A \\ 216 \end{array} \quad \begin{array}{l} I \\ 91 \end{array}$$

$$P = 216 - 91 = 125$$

$$10\% = \frac{1}{5}$$

$$20\% = \frac{1}{5}$$

$$\begin{array}{l} P \\ 125 \end{array} = \begin{array}{l} A \\ 216 \end{array}$$

$$\begin{array}{l} P \\ 5^2 \end{array} \quad \begin{array}{l} A \\ 6^2 \end{array} = 25 = 36$$

$$5^3 = 6^3$$

$$125 = 216$$



Q15. Anmol invested Rs. $(2P + 1500)$ in a bank, offers simple interest at 11.11% per annum. After three years he withdraws all amount from bank and invested in a scheme which offered compound interest at 50% per annum. Total amount received from scheme after two years is Rs. $(10.2P - 1800)$.

Find which of the following statement(s) is/are definitely true.

~~I.~~ Interest received from the scheme is $(5.2P - 300)$.

~~II.~~ Amount invested by Anmol in bank is Rs. 4500

~~III.~~ Interest received from the Bank is Rs. P

A. II only

B. I and II only

C. I and III only

D. II and III only

~~E.~~ None of these

$$(2P + 1500)$$

$$11.11\% \times 3 = 33.33\% = \frac{1}{3}$$

$$(2P + 1500) \left(1 + \frac{50}{100}\right)^2 = 10.2P - 1800$$

$$4500 + 1800 = 10.2P - 6P$$

$$6300 = 4.2P$$

$$P = \frac{6300}{4.2} = 1500$$

$$4500 \times \frac{1}{3} = 1500$$

$$= 5.2 \times 1500 - 300 = 7500 - 300 = 7200$$

$$\text{So } P = \frac{1}{2}$$

$$1 + \frac{1}{2} = \frac{3}{2}$$

$$10.2 \times 1500 - 1800 = 15300 - 1800 = 13500$$

$$15300 - 1800 = 13500$$

$$4500 \times \frac{4}{2} = 9000$$



Home Work

Q.16) Arjun and Rajiv deposited Rs. 8400 and Rs. _____ in scheme A at 20% and at 10% per annum compound interest compounded annually, respectively. Also, Arjun and Rajiv deposited Rs. _____ and Rs. 3700 in scheme B at 15% and at 24% per annum simple interest, respectively. Sum of interest earned by both from both schemes together after 2 years is Rs. _____.

The values given in which of the following options will fill the blanks in the same order in which is it given to make the statement true:

- I. 7200, 4120, 8220
- II. 9600, 3640, 8540
- III. 8000, 5400, 8772

- [1] Only I
- [2] Only II
- [3] Only III
- [4] Only II and III
- [5] Only I and III



Q.17) **Quantity-I:** The selling price of an article when it is marked 36% above its cost price and sold after a discount of Rs. 140 is Rs. 'P' and the selling price of the same article when it is marked 28% above its cost price and sold after a discount of Rs. 120 is Rs. 'Q'. If $P:Q = 19:18$, then find the cost price of the article.

Quantity-II: The compound interest received on investing Rs. 10,500 for 2 years at 'y%' p.a., compounded annually is Rs. 2,205. Find the compound interest received on investing Rs. 4,800 at a rate of $(y + 5)$ % p.a., compounded annually for 2 years.

- [1] Quantity-I > Quantity-II
- [2] Quantity-I < Quantity-II
- [3] Quantity-I \leq Quantity-II
- [4] Quantity-I = Quantity-II or No relation
- [5] Quantity-I \geq Quantity-II

Home Work



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- %
- Ratio
- No Sen
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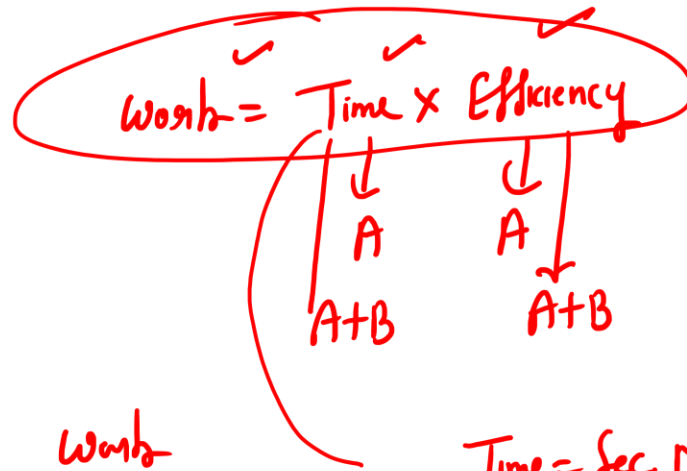


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Time & Work



Efficiency → work finished in a particular time



$$Time = \frac{Work}{Effy}$$

$$Effy = \frac{Work}{Time}$$

Time = Sec, Minutes, hr, days, --



Concept 1

$$\text{Work} = \text{Time} \times \text{Efficiency}$$

Timing given \Rightarrow

Work - Assume



LCM of timing

Multiple value of time



	60 unit ✓✓
A → 10 days	$\frac{60}{10} = 6 \text{ unit/day.} \checkmark$
B → 20 days	$\frac{60}{20} = 3 \text{ unit/day} \checkmark$
C → 30 days	$\frac{60}{30} = 2 \text{ unit/day} \checkmark$

① A+B+C = ?

$$\frac{60}{6+3+2} = \frac{60}{11} = 5\frac{5}{11} \text{ days}$$

② A+B+C → B left after 2 days

$$A+C = ?$$

$$A+B+C = 11 \times 2 = 22 \text{ unit}$$

$$60 - 22 = 38 \text{ unit}$$

$$\frac{38}{8} = 4\frac{3}{4} \text{ days}$$

$$10 - 20 - 30$$

$$\text{LCM} = 60$$

$$\text{Multiplies} = 120, 240, 100 \times$$

③ A start the work but left after 4 days then B and C join the work and B left after 3 days then find in how many days the work is done.

$$A = 4 \times 6 = 24 \text{ unit}$$

$$B+C = 3 \times 5 = 15 \text{ unit}$$

$$C = 60 - 39 = 21 \text{ unit}$$

$$\frac{21}{2} = 10.5 \text{ day}$$

$$17.5 \text{ days}$$



Q.1) A, B and C together can finish a piece of work in 10 days. If A and B together takes 20 days to finish the same work. Then find in how much time C alone finish half of the same work?

- a) 11 days
- B) 10 days ✓✓
- C) 12 days
- D) 16 days
- E) None of the above

$$\begin{array}{r|l}
 \begin{array}{l}
 \overline{3} \quad \uparrow 3 \\
 A+B+C \rightarrow 10 \text{ days} \\
 A+B \rightarrow 20 \text{ days}
 \end{array} & \begin{array}{l}
 \text{(60 unit)} \\
 6 \\
 3
 \end{array}
 \end{array}$$

5 year
 365×5
 1 chuk - 1 Month
 24 - 24
 1 unit

$$C = \frac{30}{3} = 10 \text{ days}$$



Q2. W can do 25% of a work in 30 days, X can do 1/4 of the work in 10 days, Y can do 40% of the work in 40 days and Z can do 1/3 of the work in 13 days. Who will complete the work first?

- (a) W
- (b) X
- (c) Y
- (d) Z
- E) None of the above

$$W = \frac{30}{25} \times 100 = 120 \text{ days}$$

$$X = \frac{10}{1} \times 4 = 40 \text{ days}$$

$$Y = \frac{40}{40} \times 100 = 100 \text{ days}$$

$$Z = \frac{13}{1} \times 3 = 39 \text{ days} \quad \checkmark$$



Q3. P can complete a work in 12 days working 8 hours a day. Q can complete the same work in 8 days working 10 hours a day. If both P and Q work together, working 8 hours a day, in how many days can they complete the work?

- A) $5\frac{5}{11}$ ✓✓
B) $5\frac{6}{11}$
C) $6\frac{5}{11}$
D) $6\frac{6}{11}$
E) E) None of the above

$$\begin{array}{r|l} & 480 \text{ unit} \\ P = 12 \text{ days} \times 8 \text{ hr} = 96 \text{ hr} & 5 \\ Q = 8 \text{ days} \times 10 \text{ hr} = 80 \text{ hr} & 6 \end{array}$$

$$P+Q = x \text{ days} \times 8 \text{ hr}$$

$$P+Q = \frac{480}{11}$$

$$\frac{480}{11} = x \times 8 \quad x = \frac{60}{11} = 5\frac{5}{11} \text{ days}$$



Q4. A, B and C together can complete a piece of work in 10 days. All the three started working at it together and after 4 days A left. Then B and C together completed the work in 10 more days. A alone could complete the work in:

- A) 15 days
- B) 16 days
- C) 25 days ✓✓
- D) 50 days
- E) None of the above

$$\begin{array}{r|l} & 100 \text{ unit} \\ \hline A+B+C \rightarrow 4 \text{ days} & \underline{10} \end{array}$$

$$A+B+C = 4 \text{ days} \times 10 = 40 \text{ unit}$$

$$B+C = \frac{100-40}{10} = \frac{60}{10} = 6 \text{ unit/day}$$

$$A = 10 - 6 = 4 \text{ unit/day}$$
$$\frac{100}{4} = 25 \text{ days}$$



Q5. A can do a piece of work in 10 days, B can do it in 15 days and C can do it in 20 days. They start the work together. But, after 2 days, A leaves off and after 3 days, C leaves off. B will do the remaining work. In how many days will the work get complete?

- A) 8 days
- B) 4 days
- C) $9\frac{3}{4}$ days ✓✓
- D) $8\frac{4}{5}$ days
- E) None of the above

	60 unit	
A → 10 days	6 ✓	$A+B+C = 2\text{ days} = 2 \times 13 = \underline{26}$ $B+C = 1\text{ day} = 1 \times 7 = \underline{7}$ $B = 60 - 33 = 27\text{ unit}$ $\frac{27}{4} = 6\frac{3}{4}\text{ days}$ $2 + 1 + 6\frac{3}{4} = 9\frac{3}{4}\text{ days}$
B → 15 days	(4) ✓	
C → 20 days	3 ✓	



Q6. A, B, C working independently can do a piece of work in 8, 16 and 12 days respectively. A alone works on Monday, B alone works on Tuesday, C alone works on Wednesday; A alone, again works on Thursday and so on. Consider the following statements:

1. The work will be finished on Thursday. ✓
2. The work will be finished in 10 days ✗

Which of the above statements is/are correct?

- ~~(a)~~ 1 only
 (b) 2 only
 (c) Both 1 and 2
 (d) Neither 1 nor 2
 E) None of the above

	48 unit
A → 8	6
B → 16	3
C → 12	4

(39)

- Mon - A → 6
 - Tues - B → 3
 - Wed - C → 4
] 13 unit

- Th - A → 6
 - Fri - B → 3
 - Sat - C → 4
] 13 unit

- Sun - A → 6
 - M - B → 3
 - T - C → 4
] 13 unit

- W - A → 6
 - T - B → 3
] 9 unit

- F - C
] 48 unit

✗



Q.7) X, Y and Z can complete a piece of work individually in 6 hours, 8 hours and 8 hours respectively. However, only one person at a time can work in each hour and nobody can work for two consecutive hours. All are engaged to finish the work. What is the minimum amount of time that they will take to finish

- (a) 6 hours 15 minutes
- (b) 6 hours 30 minutes
- (c) 6 hours 45 minutes ✓✓
- (d) 7 hours
- E) None of the above

	24 unit
X → 6hr	4 ✓
Y → 8hr	3 ✓
Z → 8hr	3 ✓

Y

X → 4 ✓
 Y/Z → 3 ✓
 X → 4 ✓
 Y/Z → 3 ✓
 X → 4 ✓
 Y/Z → 3 ✓
 X → (4)

→ Maximum Efficiency

6hr → 21 unit

24 - 21 = 3 unit

$\frac{3}{4} \times 60 = 45 \text{ mins}$



Q.8) A and B together can do a piece of work in 12 days which B and C together can do in 16 days. After A has been working at it for 5 days and B for 7 days, C takes up and finishes it alone in 13 days. In how many days C alone can do the work.

- a) 16 days
- b) 32 days
- c) 24 days
- d) 48 days
- E) None of the above

	48 unit
A+B → 12 days	4
B+C → 16 days	3

$$B = 1 \text{ unit/day} \quad \checkmark$$

$$A = 3 \text{ unit/day} \quad \checkmark$$

Man Pomiberty

$$A(5 \text{ days}) + B(7 \text{ days}) + C(13 \text{ days}) = 48 \text{ unit}$$

$$(A+B)(5 \text{ days}) + (B+C) 2 \text{ days} + C(11 \text{ days}) = 48$$

$$(4 \times 5) + (3 \times 2) + C(11 \text{ days}) = 48$$

$$C(11 \text{ days}) = 48 - 26 = 22$$

$$C = \frac{22}{11} = 2 \text{ unit/day} \quad \checkmark$$

$$\frac{48}{2} = 24 \text{ days}$$



Concept 2

$$\text{Work} = \text{Time} \times \text{Efficiency}$$

Work Constant

$$\text{Time} \propto \frac{1}{\text{Effy}}$$

	A	B
Time	$x = y$	
Effy		$y = x$

Relation between
Time & Efficiency in given



Q9. A works thrice as fast as B. If both of them can together finish a piece of work in 12 days, then A alone can do it in-

- A) 24 days
- B) 27 days
- C) 16 days ✓✓
- D) 18 days
- E) None of the above

$$\begin{array}{l} \text{Effy} \\ \text{Time} \end{array} \begin{array}{l} A \\ B \end{array} = \begin{array}{l} 3 \\ 1 \end{array} = \begin{array}{l} 1 \\ 3 \end{array}$$

$$\begin{array}{l} \text{Work} = \text{Time} \times \text{Effy} \\ \downarrow \quad \downarrow \\ 12 \text{ days} \times 4 = 48 \text{ unit} \end{array}$$

$$A = \frac{48}{3} = 16 \text{ days}$$

$$B = \frac{48}{1} = 48 \text{ days}$$



Q10. To do a certain work B would take three times as long as A and C together and C twice as long as A and B together. The three men together complete the work in 10 days. How long would A take separately?

- A) 30 days
- ~~B) 24 days~~
- C) 25 days
- D) 28 days
- E) None of the above

$$\begin{array}{l} \text{Time} \\ \text{Effy} \end{array} \begin{array}{l} B \\ A+C \end{array} \begin{array}{l} 3 : 1 \\ 1 : 3 = 4 \times 3 \\ 3 = 9 = 12 \end{array} \quad \begin{array}{l} \text{Time} \\ \text{Effy} \end{array} \begin{array}{l} C \\ A+B \end{array} \begin{array}{l} 2 : 1 \\ 1 : 2 = 3 \times 4 \\ 4 : 8 = 12 \end{array} \quad \begin{array}{l} A+B+C \rightarrow 10 \text{ days} \\ \text{Work} = \text{Time} \times \text{Effy} \\ 10 \times 12 \\ = 120 \text{ unit} \end{array}$$

$$\begin{array}{l} B=3 \checkmark \\ C=4 \checkmark \\ A=5 \checkmark \\ \hline 12 \end{array}$$

$$\begin{array}{l} A = \frac{120}{5} = 24 \text{ days} \\ B = \frac{120}{3} \\ C = \frac{120}{4} \end{array}$$



Concept 3

Relations btwn Work in given



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Q.11) If 12 men and 16 boys can do a piece of work in 5 days and 13 men and 24 boys can do it in 4 days, how long will 7 men and 10 boys take to do it?

- A) $9\frac{1}{3}$ days
- B) $8\frac{1}{3}$ days ✓
- C) $8\frac{2}{3}$ days
- D) 8 days
- E) None of the above

$$(12 \text{ Men} + 16 \text{ Boys}) \times 5 = (13 \text{ Men} + 24 \text{ Boys}) \times 4$$

$$\downarrow \qquad \qquad \qquad \downarrow$$

$$(24 + 16) \times 5 = 200 \text{ unit}$$

$$7 \text{ Men} + 10 \text{ Boys} = ?$$

$$\downarrow \times 2 \qquad \downarrow \times 1$$

$$14 + 10 = 24 \text{ unit/day}$$

$$60 \text{ M} + 80 \text{ B} = 52 \text{ M} + 96 \text{ B}$$

$$\frac{260}{24} = 8\frac{1}{3} \text{ days}$$

$$8 \text{ M} = 16 \text{ B}$$

$$1 \text{ M} = 2 \text{ B}$$

$$\frac{\text{M}}{\text{B}} = \frac{2}{1}$$



Q.12) A contractor undertakes to dig a canal 12 km long in 350 days and employs 45 men. After 200 days he find that only 4.5 km of the canal has been completed. Find the number of extra men he must employ to finish the work in time?

- A) 45 men
- B) 55 men ✓
- C) 65 men
- D) 75 men
- E) None of these

Part 1
 $T = 200 \text{ days}$
 $M = 45$
 $W = 4.5$

Part 2
 $T = 150$
 $M = 45 + x$
 $W = 7.5$

Chain Rule

$$= \frac{M_1 D_1}{W_1} = \frac{M_2 D_2}{W_2}$$

Work < Part 1
 Part 2

$M \rightarrow \text{Men}$
 $D \rightarrow \text{Time}$
 $W \rightarrow \text{Work}$

$$\frac{45 \times 200}{4.5} = \frac{(45+x) \times 150}{7.5}$$

$$45 + x = 100$$

$$x = 55$$



Q13. Biman alone can complete a piece of work in 25 days. With the help of Sohan, he can complete the work in _____ days. Sohan and Milan together can complete the work in 10 days. Milan alone can complete the work in _____ days. Which of the following satisfies the two blanks given in the question?

- a) 157/11, 15 ✗
- b) 10, 30
- c) 100/9, 20 ✓
- d) 12, 25
- e) None of these

B	B+S	S+M	M	work
25 days	—	10 days	—	
25	$\frac{150}{11}$	10	15	150 unit
(6)		(15) S=5	(10)	
25	$\frac{100}{4+5}$	10	20	100 unit
(4)	(100/9)	(10) S=5	(5)	



Direction (14-15) : Study the following information carefully and answer the questions given below.

Work P: The ratio of efficiency of A and B is 5:4 respectively. A and C together can complete the work in 15 days. B and C together can complete the work in $\frac{10 \times x}{7}$ days. When A's efficiency becomes twice his original efficiency, then A alone can complete the work in $[y-6]$ days.

Work Q: The ratio of efficiency of A and B is 3:2. The ratio of efficiency of B and C is 3:5. C alone can complete the work in 18 days. A and B together can complete the work in x days.

Work R: B and C take the same number of days to complete the work alone as they take to complete work P. A and B together can complete the work in y days.

(P)

A	B	A=24	120 =
Eff	5 : 4	B=30	
Time	4 : 5	A+C=15	5
	$\frac{4a}{24} = \frac{5a}{30}$	\downarrow	4
		3	8

A+C = 15 days =
 B+C = $\frac{10x}{7}$ days = $\frac{120}{7}$ =
 $A = (y-6) \times 2$ $\frac{24}{2} = y-6$ $y=18$

(Q)

$\frac{1}{15} - \frac{1}{4a} = \frac{7}{120} - \frac{1}{5a}$

$\frac{1}{5a} - \frac{1}{4a} = \frac{7}{120} - \frac{1}{15}$

$\frac{4-5}{20a} = \frac{7-8}{120}$

$+\frac{1}{20a} = +\frac{1}{120 \times 6}$ $a=6$

(Q)

A	B	C
(3=2)	(3)	(5)
Eff	9	6 : 10 =

Work = 180 unit =
 A = $\frac{180}{9} = 20$ day
 B = $\frac{180}{6} = 30$ day
 C = $\frac{180}{10} = 18$ days
 A+B = $\frac{180}{18} = 12$ day = x
 x=12

(R)

	360	
B → 30		12
C → 40		9
A+B → 18 days	20	
\downarrow	8	

20 days
 $10a = \frac{1}{20}$

$\frac{1}{2} = \frac{1}{20}$

Q.14) A starts work P alone. After $[\frac{y}{2} + 1]$ days, A left the work then the rest of the work completed by B and C together in ____ days

~~I). $x-2$ $12-2=10$~~
 II). $\frac{y}{2} + 1$ $\frac{18}{2} + 1 = 10$
 III). $[\frac{x+y}{2}]$ 3×4

	120
A → 24	5
B → 30	4 ✓
C → 40	3 ✓

- a. Only A
- b. Only B
- c. Both A and B
- d. Both B and C
- e. Only C

$A \rightarrow (\frac{18}{2} + 1) \times 5 = 50 \text{ units}$
 $120 - 50 = 70$
 $B + C = \frac{70}{7} = 10 \text{ days}$

Q.15) Find which of the following takes the minimum number of days?

- I). B and C together can complete work R with twice their original efficiency.
- II). A and C together can complete work Q.
- III). A and B together can complete work P.

- a. Only III
- b. Only I
- c. Only II
- d. Only I and II
- e. None of these

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$$\text{Work} = \text{Time} \times \text{Efficiency}$$

① Distance Constant

$$\text{Time} \propto \frac{1}{\text{Speed}}$$

$$\begin{aligned} \text{Time } a &= b \\ \text{Speed } b &= a \end{aligned}$$

$$\text{Distance} = \text{Time} \times \text{Speed}$$

$$\text{Time} = \frac{D}{S}$$

$$\text{Speed} = \frac{D}{T}$$

↓
Sec

Minutes

Hour

Week

...

...

...

...

↳ Distance travelled in a particular

time

②

Time Constant
Speed \propto Distance

$$\begin{aligned} \text{Time Same} \\ \text{Speed} &= a = b \\ \text{Distance} &= a = b \end{aligned}$$



Q.1) Two cars run to a place at the speeds of 45 km/hr and 60 km/hr respectively. If the second car takes 5 hrs less than the first for the journey find the length of the journey.

- A) 900 km
- B) 600 km
- C) 700 km
- D) 850 km

Distance Constant
 $\text{Time} \propto \frac{1}{\text{Speed}}$

Let Distance = x

$$\frac{x}{45} - \frac{x}{60} = 5$$

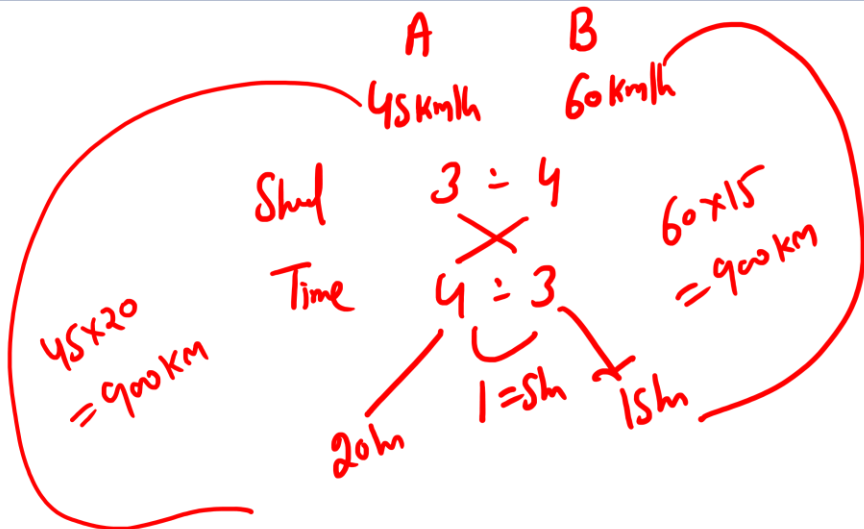
Simplify

Distance Constant
 Relation btwn two speed are given
 total time / diff btwn time

$$\frac{60x - 45x}{60 \times 45} = 5$$

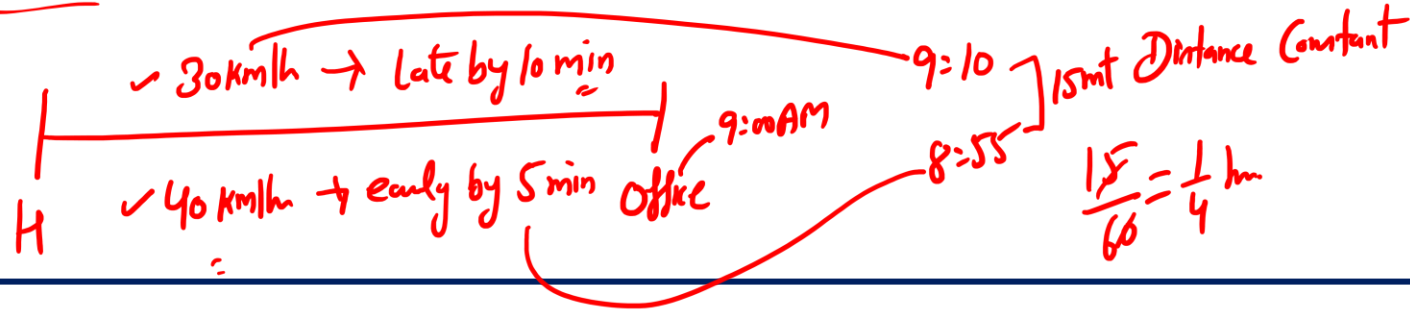
$$x = \frac{5 \times 60 \times 45}{15} = 900 \text{ km}$$

$$\text{Distance} = \frac{\text{Product of Speed} \times \text{diff of time}}{\text{diff of Speed}} = \frac{60 \times 45 \times 5}{15} = 900 \text{ km}$$



Q.2) A man covers a certain distance between his house and office on scooter. Having an average speed of 30 km/hr, he is late by 10 min. However, with a speed of 40 km/hr, he reaches his office 5 min earlier. Find the distance between his house and office.

- A) ~~30 km~~
- B) 50 km
- C) 40 km
- D) 25 km

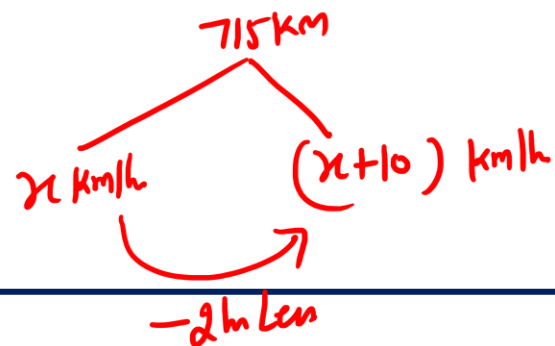


$$\begin{aligned} \text{Distance} &= \frac{40 \times 30}{40 - 30} \times \frac{1}{4} \\ &= \frac{40 \times 30}{10} \times \frac{1}{4} = \underline{\underline{30 \text{ km}}} \end{aligned}$$



Q.3) A car covers a distance of 715 km at a constant speed. If the speed of the car would have been 10 km/hr more, then it would have taken 2 hrs less to cover the same distance. What is the original speed of the car?

- A) 45 km/hr
- B) 50 km/hr
- ~~C) 55 km/hr~~
- D) 65 km/hr



$$\begin{array}{r} 5 \overline{) 715} \\ \underline{11} \\ 143 \\ \underline{13} \\ 0 \end{array}$$

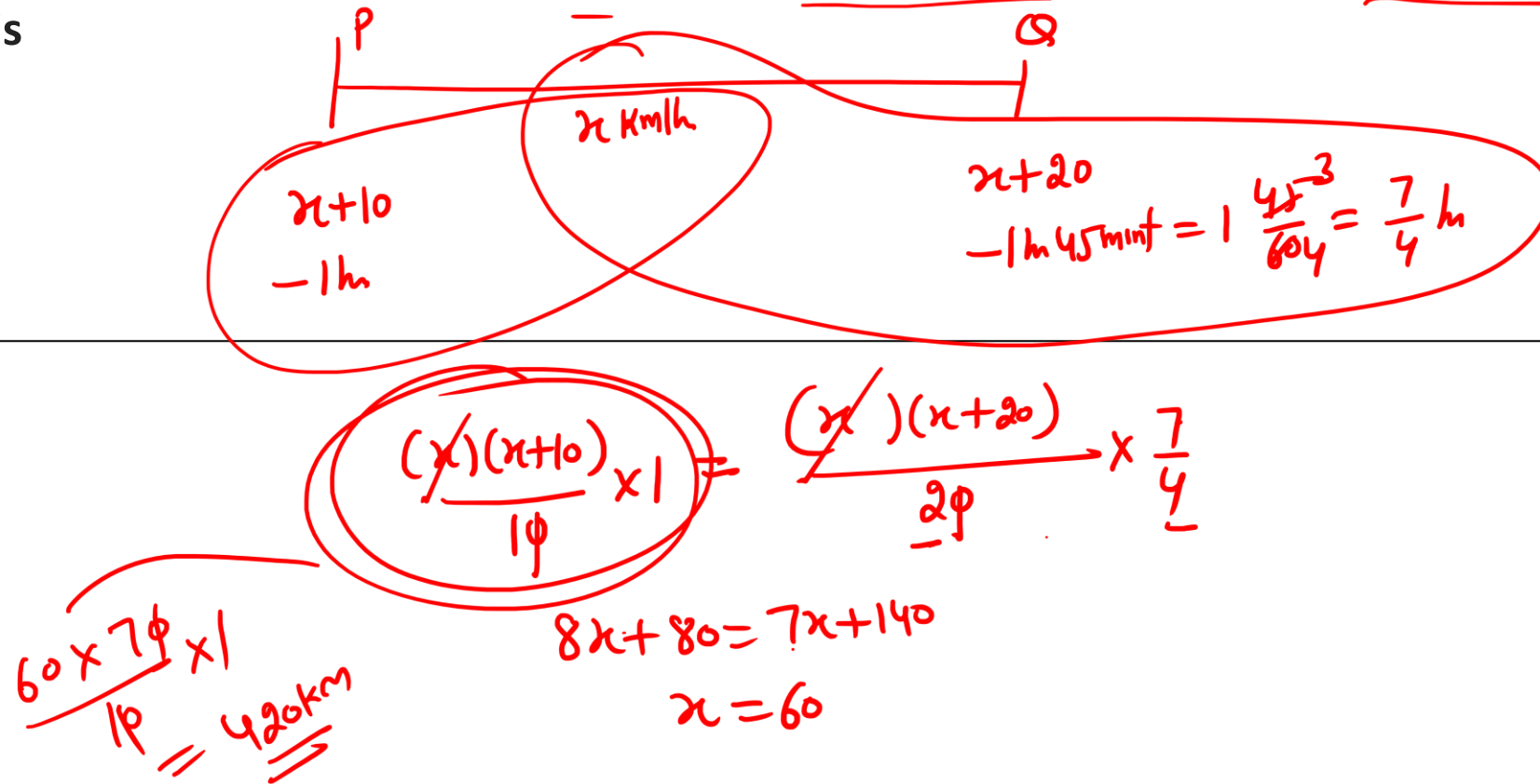
$$715 = \frac{(x)(x+10)}{105} \times 2$$

$$\begin{aligned} (x)(x+10) &= 5 \times 715 \\ &= 5 \times 5 \times 11 \times 13 \\ &= 55 \times 65 \end{aligned}$$



Q4. A car travels from P to Q at a constant speed. If its speed were increased by 10 km/hr, it would have been taken one hour lesser to cover the distance. It would have taken further 45 minutes lesser if the speed were further increased by 10 km/hr. The distance between the two cities is

- A 540 km
- B 420 km
- C 600 km
- D 620 km



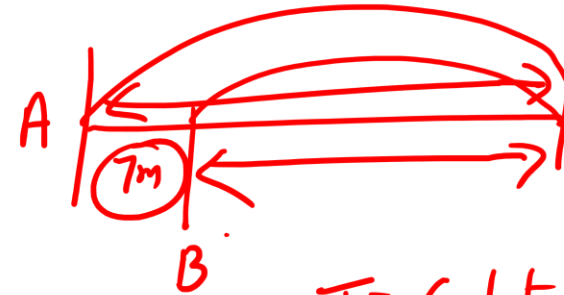
x km/h
 $x+10$
 $-1h$
 $x+20$
 $-1h 45 \text{ min} = 1 \frac{45}{60} = \frac{7}{4} h$
 $\frac{(x)(x+10)}{10} \times 1 = \frac{(x)(x+20)}{20} \times \frac{7}{4}$
 $8x + 80 = 7x + 140$
 $x = 60$
 $\frac{60 \times 7/4 \times 10}{10} = 420 \text{ km}$



Q5. A run 25% faster than B and is able to allow B a lead of 7 m to end a race in dead heat. What is the length of the race?

- A. 10 m
- B. 25 m
- C. 45 m
- D. 15 m
- ~~E. 35 m~~

Speed A B
 $125 : 100$
 $5 : 4$ ✓



Time Constant
 Speed \propto Distance

Distance $5 = 4$
 $1 = 7m$
 $5 \times 7 = 35m$
 $4 \times 7 = 28m$



Q6. A motor starts with the speed of 70 kmph with its speed increasing every two hours by 10 kmph. In how many hours will it cover 345 kms?

- A. 2 hours 15 minutes
- B. 4 hours 30 minutes ✓✓
- C. 4 hours 5 minutes
- D. Cant be determined
- E. None of these

① 70 ✓
② 70 ✓
③ 80 }
④ 80 }
⑤ 90 }
⑥ 90 }
⑦ 100 }

$4 \text{ h} = 300 \text{ km}$
 $\frac{45 \text{ km}}{90} = \frac{1}{2} \text{ h} = 30 \text{ mint}$

345 km

4 h 30 mint



Q.7) The taxi charges in a city consist of fixed charges and additional charges per kilometer. The fixed charges are for a distance of up to 5 km and additional charges are applicable per kilometer thereafter. The charge for a distance of 10 km is Rs 350 and for 25 km is Rs. 800. The charge for a distance of 30 km is-

- A. Rs. 800
- B. Rs. 750
- C. Rs. 900
- D. Rs. 950
- E. None of these

$FC(5km) + \text{Additional Charge}$

$200 \rightarrow 5km + 5km \times 30 = 150 = 350$
 $200 \rightarrow 5km + 20km \times 15 = 800$
 $200 \rightarrow 5km + 25km \times 30 = 950$

$\frac{450}{15} = 30/km$



Q8. A man rides at the rate of 18 km/hr, but stops for 6 minutes to change horses at the end of every 7th km. The time that he will take to cover a distance of 90 km is

- A 6 hrs
- ~~B 6 hrs. 12 min.~~
- C 6 hrs. 18 min.
- D 6 hrs. 24 min.



$$7 \overline{) 90} \text{ (12)}$$

$$\underline{84}$$

$$6$$

Ride + Rest = Total time

$$\frac{90}{18} + 12 \text{ hrs} \times 6 \text{ mint}$$

$$5 \text{ hr} + 72 \text{ mint} \quad \underline{1 \text{ hr } 12 \text{ mint}}$$

$$\underline{\underline{6 \text{ hr } 12 \text{ mint}}}$$



Q9.

Quantity I: A bus travels a distance 60km at the speed of 30kmph. It covers the next 15km of its journey at the speed of 5kmph and the last 60km of its journey at the speed of 20kmph. Find the average speed of the bus.

Quantity II: A car covers a distance of 240km in a certain amount of time at speed of 30 kmph. What is the average speed of bike that covers distance of 30km less than that of the car in 2 hours less than time taken by car?

- A. Quantity I > Quantity II
- B. Quantity I \geq Quantity II
- C. Quantity II > Quantity I
- D. Quantity II \geq Quantity I
- E. Quantity I = Quantity II or Relation cannot be established

$$\frac{60\text{km}}{30\text{kmh}} = 2 \quad \frac{15\text{km}}{5\text{kmh}} = 3 \quad \frac{60\text{km}}{20\text{kmh}} = 3$$

$$\text{Avg Speed} = \frac{\text{Total Distance}}{\text{Total time}} = \frac{60+15+60}{2+3+3} = \frac{135}{8} = \text{Avg} = 17\text{kmh}$$

$$\text{(2) } \frac{\text{Car } 240}{30\text{km}} = 8\text{h}$$

$$\text{Bike} = \frac{240-30}{8\text{h}-2\text{h}} = \frac{210}{6\text{h}} = 35\text{kmh}$$



Q10. A bus covers the first x Km in 25 mins and the remaining 87 Km in one hour. Then the average speed of the bus is Km/hr. Which of the following option satisfies the given condition?

- a) 32, 72
- b) 44, 100
- ~~c) 32, 84~~
- d) 36, 84
- e) None of these

$$\frac{x+87}{1 + \frac{25}{60}} = \frac{(x+87)}{17} \times 12 \quad \frac{1197}{17} \times 12 = 84 \text{ km/h}$$



Q11. Viraj travels at $(S+10)$ km/hr and takes $(T-1)$ hrs to cover D km. If he travels $(S-20)$ km/hr and takes $(T+5)$ hrs to cover D km and also he travels $(S-15)$ km/hr and takes $(T+3)$ hrs to cover D km. From the statement given in the above question which of the following can be determined.

- A) Value of T ✓
 B) Value of S ✓
 C) Find the distance covered by a man if he travels at $(S+10)$ km/hr and takes $(T+2)$ hrs ✓
 D) Value of D ✓

- a) Only A) and B)
 b) Only C) and D)
 c) All A), B), C) and D)
 d) Only A) and D)
 e) None

Speed	Time	Distance
$S+10$	$T-1$	$D = \text{---} \textcircled{1}$
$S-20$	$T+5$	$D = \text{---} \textcircled{2}$
$S-15$	$T+3$	$D = \text{---} \textcircled{3}$

$$(S+10)(T-1) = (S-20)(T+5)$$

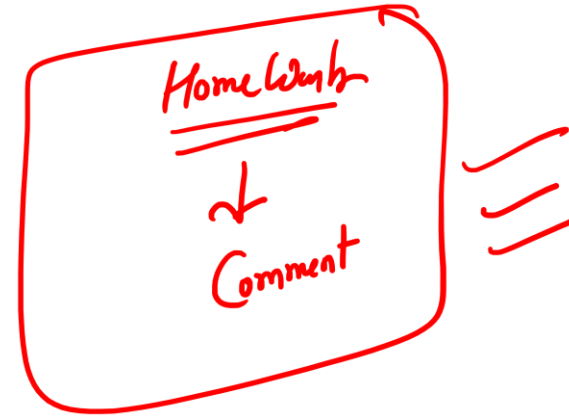
S
 T
 D

$$\begin{aligned} 2x+3y &= \text{---} \\ 5x+1y &= \text{---} \end{aligned}$$



Q12. A person travels a total distance of 1260 km partly by bike and partly by Car. The speed of Bike and Car is 4 : 3. If the distance travelled by car is 180 km more than that by bike, then What is the ratio of time taken by car and bike to travel?

- A. 11 : 9
- B. 16 : 6
- C. 9 : 16
- D. 16 : 9
- E. 17 : 5

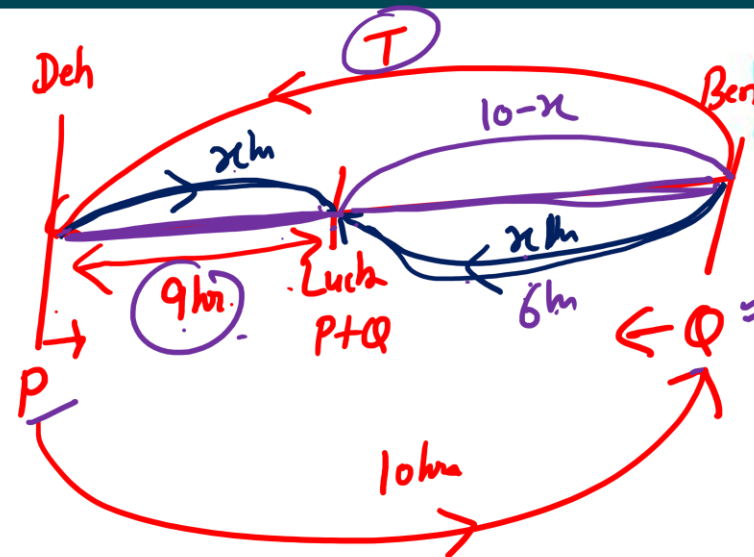


Q13. Two cars P and Q start travelling at the same time towards each other with uniform speed from stations Dehradun and Bangalore respectively. Car P reaches Bangalore in 10 hours, while car Q takes 9 hours to reach Dehradun after meeting car P at Lucknow. If total time taken by car Q to travel from Bangalore to Dehradun is 't' hours, then find which of the following is incorrect:

- I. $t + 1 = 4^2$ $\rightarrow 15 + 1 = 4^2$
- II. t is a perfect number $\rightarrow 15 \rightarrow 1, 3, 5, 15$
- III. t is an even number \times

- A. Only I
- B. Only II
- C. Both I and II
- D. All I, II and III
- E. Both II and III

$T = 15$



$$\frac{x}{9} \neq \frac{10-x}{x}$$

$$x^2 = 90 - 9x$$

$$x^2 + 9x - 90 = 0$$

$$+9 \quad -90$$

$$15, -6$$

$$x = -15, +6$$



Direction (14-16) : Read the following information carefully and answer the questions based on it.

There are five different vehicles car, bus, bike, truck, and cab. They travel different distances with different speeds and the time taken by them to travel a certain distance is also different.

The time taken by the car to travel 250 km with the speed of $(S-10)$ km/h is $(S/12)$ hours. The same car can cross a man running in the opposite direction with a speed of $(1/5)$ th of that of a car and covers $(D+40)$ km in $(D/50)$ hours. The bus covers a distance of $(D-60)$ km with a speed of $(V+30)$ km/h in $(V/20)$ hours. The bike can cross the same man whom the car has crossed running in the opposite direction with the speed of the bike is $4T$ km/h in T hours, covering $(7V+20)$ km, running in the same direction. The truck travels a distance of $(X+60)$ km with a speed of $(X-20)$ km/h in $(T/5)$ hours. Cab travels $(Y+30)$ km distance with a speed of $(Y-90)$ km/h in $(Y/50)$ hours.

Note:

Values of S , D , V , T , X , and Y are positive integers.

	Distance	Speed	Time
Car	250	$S-10$ (50)	$\frac{S}{12}$ (5)
Bus	140	$V+30$ (70)	$\frac{V}{20}$ (2)
Bike	250	(40)	
Truck	$X+60$ (160)	$X-20$ (80)	$\frac{T}{5}$ (2)
Cab	$Y+30$ (180)	$Y-90$ (60)	$\frac{Y}{50}$ (3)

$S=60$ Man's speed 10
 $D=200$
 $V=40$
 $T=10$
 $X=100$
 $Y=150$

$$Y=150 \quad (Y-90) \left(\frac{Y}{50}\right) = Y+30$$

Bike \swarrow Man
 $4T$ — 10 km/h

$$(4T-10) \times T = 7V+20$$

$$= 300$$

$$4T^2 - 10T - 300 = 0$$

$$-10 \quad -1200$$

$$\frac{-40 \pm 30}{2} \quad T = \frac{40}{2} = 10$$



Q.14) A train whose length is 300 meters, crosses a platform of length of length P meters in 4 seconds with the speed of A m/sec. Another train, whose length is 40 meters less than that of the first train, crosses the same platform in 2 seconds with a speed of 80 m/sec more than that of the first train. Find the time taken by the bus to cover (P+350) km, if its speed is (A+50) km/h.

- a. 2 hours
- b. 4 hours
- ~~c. 3 hours~~
- d. 5 hours
- e. None of these

$$300 + P \rightarrow 4 \text{ sec.} \times A$$

$$260 + P \rightarrow 2 \text{ sec} \times (A + 80)$$

$$4A = 300 + P$$

$$2A + 160 = 260 + P$$

$$4A - 300 = 2A - 160$$

$$2A = 200$$

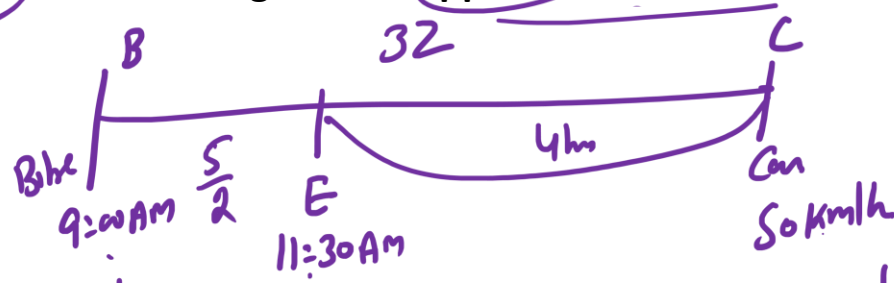
$$A = 100$$

$$\frac{400}{100} = 4 \text{ km}$$

$$P = 100$$

Q.15) The distance between city B and city C is 32 km. The bike starts from City B towards City C at 9:00 am, but stops at 11:30 am after reaching City E, which is somewhere between City B and City C. Now, the bike is stopped and waiting for the car to reach City E from City C. The time taken by the car to reach city E from city C is 4 hours. Find the time taken by bike and car to cover (22-20) km, travelling in the opposite direction to each other.

- a. 2 hours
- b. 1 hour
- c. 6 hours
- d. 9 hours
- e. None of these



Bike
9:00 AM
40 km/h

$\frac{5}{2}$

E
11:30 AM

4 km

Car
50 km/h

$$40 \times \frac{5}{2} + 50 \times 4 = 32$$

$$32 = 200$$

$$2 = 100$$

$$22 - 20 = 180$$

$$\frac{180}{90} = 2 \text{ hr}$$

$$40 + 50 = 90 \text{ km/h}$$

2



Q.16) For the questions given below, three statements I, II & III have been given. Analyse and answer whether the data provided in the three statements are true or not.

The time taken by a train, whose length is $(X+Y)$ meters to cross a tunnel whose length is $2V$ meters with the speed of $(S+6)$ m/sec is M seconds. Whereas, the time taken by the truck to cover $(U-W)$ km distance is M hours. The cab can cover $(U-60)$ km distance in 9 hours.

Statement I: The ratio of the values of U to that of W is 3:1.

Statement II: The bus can cover $(W+10)$ km in 5 hours.

Statement III: The value of W is half of that of X .

- a. Only statement III is true
- b. Only statement I is true
- c. Both the statements I and II are true
- d. All the statements I, II and III are true
- e. Neither statement I or II nor III is true

Home Work



Thank You



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Time Speed Distance

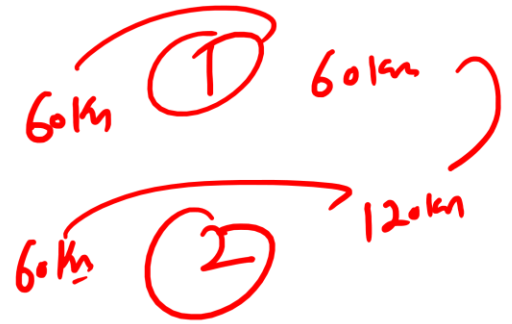
(1) Distance = Time \times Speed

(3) Time Constant
Speed \propto Distance

(2) Distance Constant
Time $\propto \frac{1}{\text{Speed}}$

(4) Average Speed = $\frac{\text{Total Distance}}{\text{Total time}}$

✓ ✓ (5) Speed Constant
Time \propto Distance



Concept of trains

① Conversion of Speed

$$\text{km/h} \rightarrow \text{m/sec} \quad \frac{5}{18} \times \frac{1000}{1000} = \frac{5}{18}$$

$$72 \text{ km/h} \rightarrow 72 \times \frac{5}{18} = 20 \text{ m/sec}$$

$$\text{m/sec} \rightarrow \text{km/h} \quad \times \frac{18}{5}$$

$$25 \text{ m/sec} \rightarrow 25 \times \frac{18}{5} = 90 \text{ km/h}$$

$$\frac{60 \times 60^3}{1000} = \frac{18}{5} \text{ km/h}$$



(2)

Distance

Train

No length

Point, Pole, Teatall, Man,



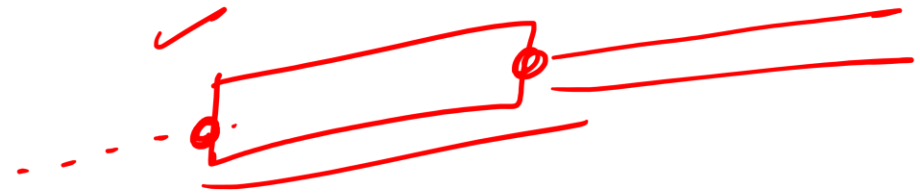
$$\text{Distance} = \text{Train's length}$$



Length

Train, Platform, Tunnel, Bridge, Curve

$$\text{Distance} = \text{Train's length} + \text{length}$$



(3)

Relation Speed

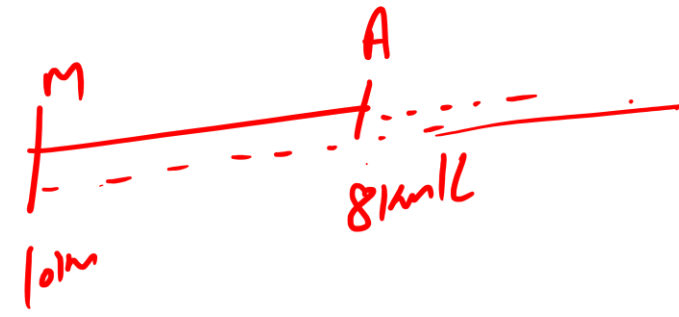
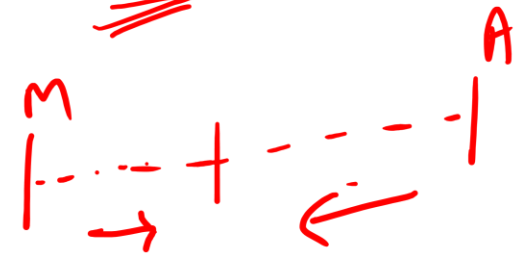


When two trucks are working \Rightarrow

(1) Timing Same

✓ Direction opposite
 \Rightarrow RS = Sum of Speeds

-- Direction same
 \Rightarrow RS = diff of Speed



Q1. A 400 m long train cross a 200 m long platform in 30 seconds, the speed of train is :

- (a) 36 km/hr
- (b) 90 km/hr
- (c) 72 km/hr ✓✓
- (d) 54 km/hr

$$\text{Speed} = \frac{\text{Distance}}{\text{Time}}$$
$$= \frac{400 + 200}{30} = \frac{600}{30} = 20 \text{ m/sec}$$

$$20 \times \frac{18}{5} = 72 \text{ km/hr}$$



Q2. A train travelling at 100 km/h overtakes a motorbike travelling at 64 km/h in 40 sec. What is the length of the train in meters?

- A. 1777 m
- B. 1822 m
- C. 400 m ✓✓
- D. 1111 m
- E. 600 m

$$R_d = 100 - 64 = 36 \text{ km/h} = 36 \times \frac{5}{18} = 10 \text{ m/sec}$$

$$\text{Time} = 40 \text{ sec}$$

$$\text{Distance} = 40 \times 10 = \underline{\underline{400 \text{ m}}}$$



Q3. A train Pawan express of length 380 m running with the speed of 108 km/h crosses a platform of certain length in 37 seconds. Another train, Toofan express of certain length running with a speed of 90 km/h crosses the platform in 42.6 seconds. What will be the time taken by both trains to cross each other if they run in opposite directions.

- A. 12 seconds
- B. 10 seconds
- C. 9 seconds
- D. 14 seconds
- ~~E. 13 seconds~~

Pawan

$$380 + \text{Platform} = 108 \text{ km} \times 37 \text{ sec.}$$

$$= 108 \times \frac{5}{18} \times 37$$

$$1110 - 380 = 730 \text{ m}$$

Toofan

$$\text{Train} + 730 = 90 \times \frac{5}{18} \times 42.6$$

$$= 1065$$

$$1065 - 730 = 335$$

$$(108 + 90) \times \frac{5}{18} \times \text{Time} = 380 + 335$$

$$\text{Time} = \frac{143}{215} \times 18 = 13 \text{ Sec}$$



Q4. Train A, 240 m long, crosses a platform double its length in 24 seconds. Find the approx. time taken to cross train B, 200 m long and travelling at 108 kmph in opposite direction?

- A. 12 seconds
- B. 10 seconds
- C. 14 seconds
- D. 15 seconds
- ~~E. 7 seconds~~

$$6 \frac{108 \times 5}{18} = 30 \text{ sec.}$$

$$240 + 480 = 24 \text{ sec} \times \text{Speed}$$

$$\text{Speed} = \frac{720}{24} = 30 \text{ m/sec}$$

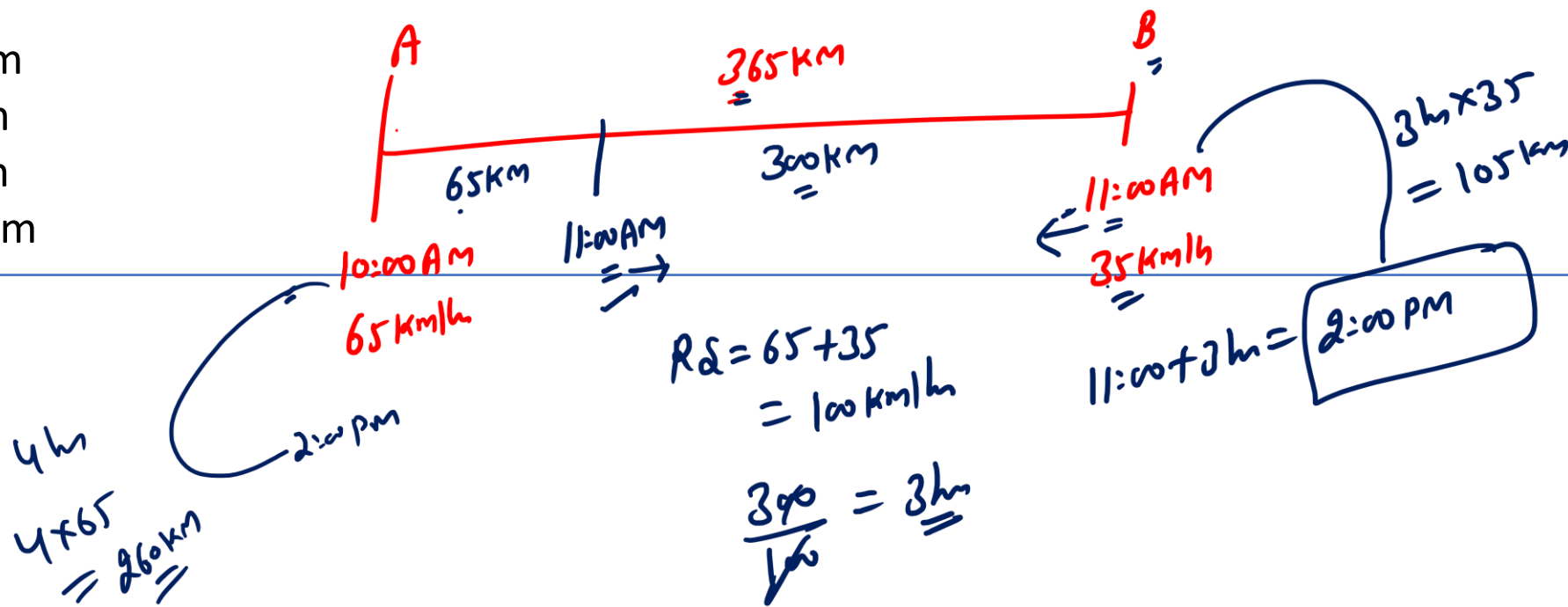
$$A + B = (30 + 30) \text{ m/sec} \times \text{Time}$$
$$240 + 200$$

$$\text{Time} = \frac{440}{60} = 7 \text{ sec}$$



Q5. The distance between two stations A and B is 365 km. A train starts at 10 A.M. from A and moves towards B at a speed of 65 km/hr. Another train starts B at 11 a.m and moves towards A at a speed of 35 km/hr. How far from B will two trains meet and at what time?

- ~~A) 105,2 p.m~~
- B) 100,4 p.m
- C) 100,2 p.m
- D) 100,55 p.m



Q6. The distance between two stations, Delhi and Amritsar, is 450 km. A train starts at 4 PM from Delhi and moves towards Amritsar at an average speed of 60 km/hr. Another train starts from Amritsar at 3:20 pm and moves towards Delhi at an average speed of 80 km/hr. How far from Delhi will the two trains meet and at what time?

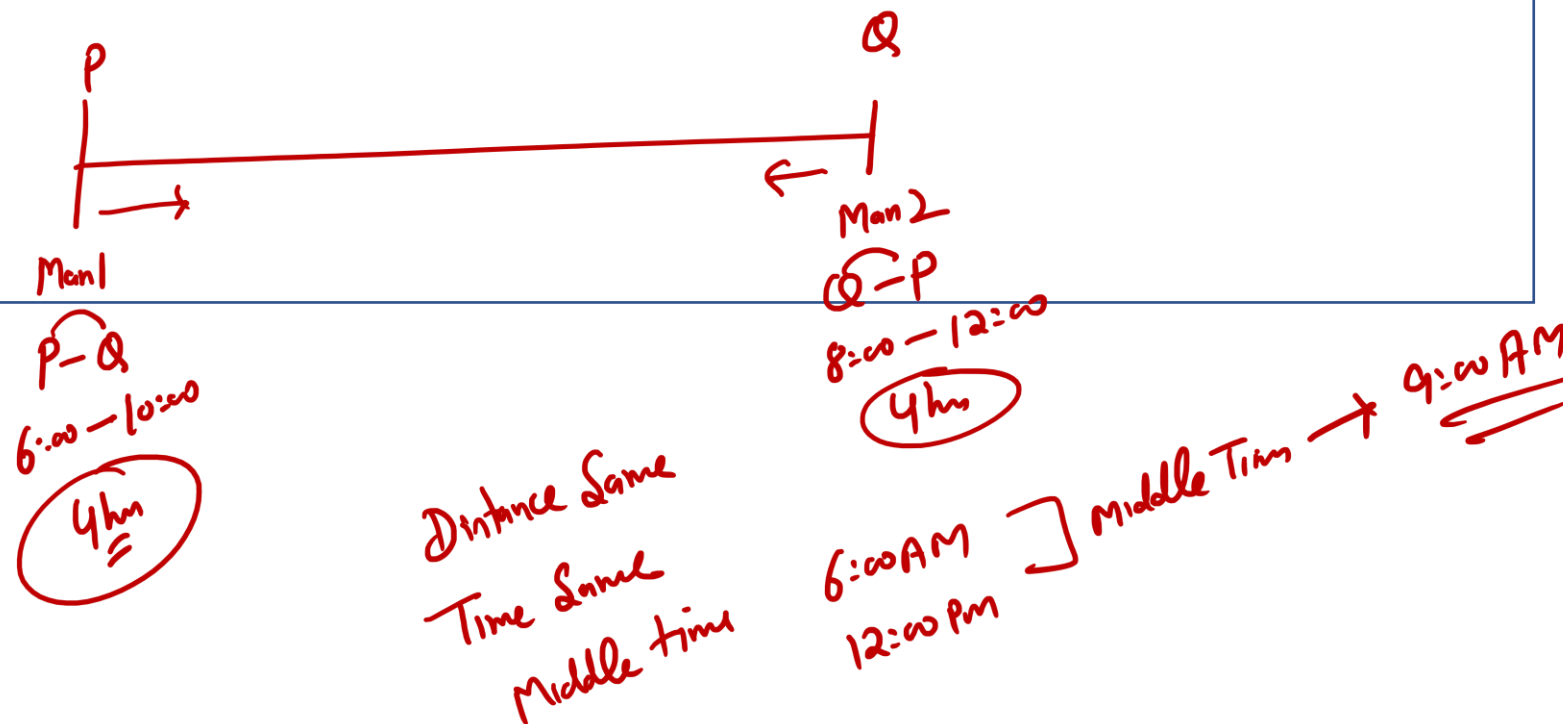
Home Work

- A) 170, 5:30
- B) 190, 6:50
- C) 170, 6:50
- D) 190, 5:30



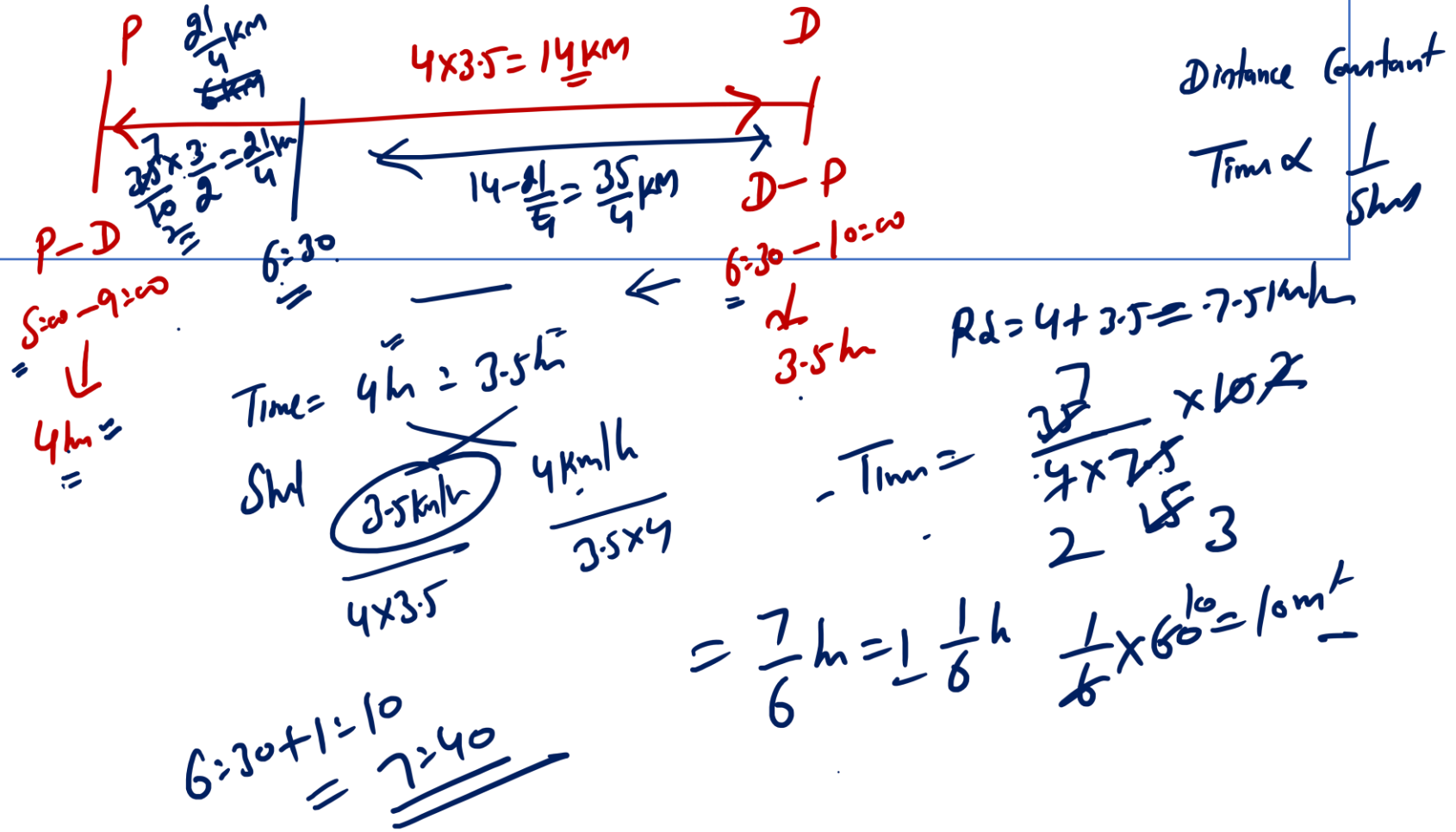
Q7. A man leaves a point P at 6 am and reaches the point Q at 10 am. Another man leaves the point Q at 8 a.m and reaches the point P at 12 noon. At what time do they meet?

- A) 11 am
- B) 8 am
- ~~C) 9 am~~
- D) 10 am



Q8. A train leaves Patna at 5 a.m. and reaches Delhi at 9 a.m. Another train leaves Delhi at 6:30 a.m. and reaches Patna at 10 a.m. At what time do the two trains meet?

- ~~A) 7:40 am~~
- B) 8:40 am
- C) 7:20 am
- ~~D) 7:40 pm~~



Q9. Two trains, Train A and Train B cross each other completely in 18 sec while travelling in opposite directions, speed of train A is 72 km/hr and speed of train B is 54 km/hr. Length of train A is 170 m less than the train B. From the statement given in the above question which of the following can be determined.

- A) Length of train A ✓
- B) Length of train B ✓
- C) Time taken by train B to cross a 130 m length of bridge //
- D) Time taken by train A to cross a 70 m pole //

- a) All A), B), C) and D)
- b) Only B) and C)
- c) Only D) and B)
- d) Only A e) Only C

$$R_2 = (72 + 54) \frac{5}{18}$$

$$T = 18$$

$$A + B = 18 \times \frac{126 \times 5}{18}$$

$$= 630$$

$$B - A = 170$$

$$A + B = 630$$

$$2B = 800$$

$$B = 400$$

$$A = 230$$

$$\frac{400 + 130}{54 \times \frac{5}{18}}$$

$$\frac{230 + 70}{72 \times \frac{5}{18}}$$



Q10. A train can cross a platform of length 750 m in 72 seconds. It can cross a bridge of length 100 m in 36 seconds.

Quantity I: Find the time taken by the train to cross another train of same length running in the direction of the train with the speed of 10 Km/h.

Quantity II: Find the time taken by the train to cross another train of length 700 m coming from the opposite direction with the speed of 25 Km/h.

Quantity III: 20 seconds

- a) $>, >$
- b) $=, >$
- c) $<, >$
- d) $<, <$
- e) $<, =$

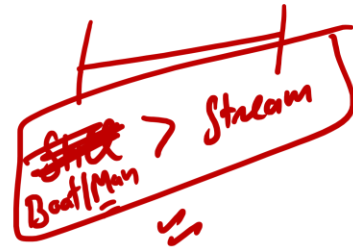
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Boat & Stream

Boat/Man in Still water $\rightarrow x$ km/h

Rate of Stream/Current $\rightarrow y$ km/h



Distance Constant

Time $\propto \frac{1}{\text{Speed}}$

Along the Stream (Down Stream) = Still + Stream = $x + y$ km/h

Against the Stream (Up Stream) = Still - Stream = $x - y$ km/h

$$\begin{aligned} \text{Still water} &= \frac{DS + US}{2} \\ &= \frac{x + y + x - y}{2} \\ &= x \end{aligned}$$

$$\text{Stream} = \frac{DS - US}{2}$$



Q11 . A boatman goes 2 km against the current of stream in 1 hour and goes 1 km along the current in 10 minutes. How long will he take to go 5 km in stationary water?

- A) 40 min
- B) 1 hour
- ~~C) 1 hr 15 min~~
- D) 1 hr 30 min

$$U_S = \frac{2 \text{ km}}{1 \text{ hr}} = 2 \text{ km/hr}$$

$$D_S = \frac{1 \text{ km}}{\frac{10}{60}} = \frac{1}{\frac{1}{6}} \times 6 = 6 \text{ km/hr}$$

$$\text{Still} = \frac{D_S + U_S}{2} = \frac{6 + 2}{2} = 4 \text{ km/hr}$$

$$\text{Time} = \frac{5}{4} = 1\frac{1}{4} \text{ hr} = \underline{\underline{1 \text{ hr } 15 \text{ min}}}$$

$\frac{1}{4} \times 60 = 15$



Q12. Speed of a boat is 5 km per hour in still water and the speed of the stream is 3 km per hour. If the boat takes 3 hours to go to a place and come back, distance of place is:

- A) 3.75 km
- B) 4 km
- ~~C) 4.8 km~~
- D) 4.25 km

Still = 5 km/h Stream = 3 km/h

$$DS = 5 + 3 = 8 \text{ km/h}$$
$$US = 5 - 3 = 2 \text{ km/h}$$

Distance Constant
Two Speed are constant
Total time

$$\text{Distance} = \frac{8 \times 2}{8 + 2} \times 3$$
$$= \frac{48}{10} = \underline{\underline{4.8 \text{ km}}}$$

$$\text{Distance} = \frac{\text{Product of Speed} \times \text{Total time}}{\text{Sum of Speed}}$$



Q13. The speed of a motor-boat is that of the current of water as 36: 5. The boat goes along with the current in 5 hours 10 minutes. It will come back in

- A) 5h 50 min
- B) 6h
- ~~C) 6h 50 min~~
- D) 12h 10 min

Handwritten solution:

	DS	US	
	$36+5$	$36-5$	
Speed	41	=	31

Time

$31 = 41$

↓
Sh 10 min

$5 + \frac{10}{60}$

$= \frac{31}{6} \text{ hr}$

$\times \frac{1}{6}$

$\frac{41}{6} = 6\frac{5}{6} \text{ hr} = \underline{\underline{6 \text{ hr } 50 \text{ min}}}$



Q14. A boat goes 30 km upstream and 44 km downstream in 10 hour. It goes 40 km upstream and 55 km downstream in 13 hour. The speed of the boat in still water is:

- ~~A) 8 km/hr.~~
- B) 6 km/hr.
- C) 12 km/hr.
- D) 6.5 km/hr.

$$= \frac{30 \text{ km}}{U_2} + \left(\frac{44}{D_2} \right) = 10 \text{ h} \quad \times 4$$

$$\frac{120}{U_2} + \frac{176}{D_2} = 40$$

$$\frac{D_2 + U_2}{2}$$

$$\frac{40}{U_2} + \left(\frac{55}{D_2} \right) = 13 \text{ h} \quad \times 3$$

$$\frac{120}{U_2} + \frac{165}{D_2} = 39$$

$$\frac{11 + 5}{2} = 8 \text{ km/h}$$

Assume $D_2 = 11$

$$\frac{30}{U_2} + \frac{44}{11} = 10$$

$$= 5$$

$$\frac{40}{U_2} + \frac{55}{11} = 13$$

$$\frac{11}{D_2} = 1 \quad D_2 = 11$$

$$\frac{30}{U_2} + \frac{44}{11} = 10$$

$$U_2 = \frac{30}{6} = 5$$



Q15. A boat goes 24 km upstream and 35 km downstream in 9 hour. It goes 30 km upstream and 21 km downstream in 8 hour. The speed of the boat in still water is:

- A) 8 km/hr.
- B) 6 km/hr.
- C) 12 km/hr.
- ~~D) 6.5 km/hr.~~

$$\frac{24}{U_2} + \frac{35}{D_2} = 9$$

$$\frac{30}{U_2} + \frac{21}{D_2} = 8$$

Let $D_2 = 7$

$$\frac{30^5}{26} + \frac{21^3}{7} = 8$$

$U_2 = 6$

$$\frac{24^4}{48} + \frac{35^5}{7} = 9$$

$$\frac{7+6}{2} = 6.5 \text{ km/hr}$$

40 \swarrow 72



Q16. Boat A can travel D km upstream in 108 minutes, while the boat can cover D^2 km downstream in D hours and 12D minutes.

Quantity I: Find the speed of the boat A in still water is what percent more than the speed of stream?

Quantity II. If the speed of boat B in still water is 60% more than that of boat A, and boat B can row in the same river as boat A, then the downstream speed of boat B is what percentage of the speed of boat A in still water.

- A. Quantity I > Quantity II
- B. Quantity I < Quantity II
- C. Quantity I \geq Quantity II
- D. Quantity I \leq Quantity II
- E. Quantity I = Quantity II or No relation

(A) $St_{up} = \frac{DKm}{\frac{108 \times 60}{60 \times 5}} = \frac{D \times 5}{9}$

$St_{down} = \frac{D^2}{D + \frac{12D}{60 \times 5}} = \frac{D^2}{\frac{6D}{5}} = D \times \frac{5}{6}$

$U_2 = D \times \frac{5}{9}$

$DS = D \times \frac{5}{6}$

Still: Stream
 $S = 1$

Still: $\frac{D \times 75}{S \times 2}$
Stream: $\frac{D \times 15}{S \times 2}$
 $S = 1$
 $\frac{1}{1} \times 100 = 400\%$

(1) $Still = \frac{D \times 75}{S \times 2} = \frac{D \times 15}{S \times 2}$

Still = $\frac{D \times \frac{5}{6} + D \times \frac{5}{9}}{2} = \frac{D \left[\frac{5}{6} + \frac{5}{9} \right]}{2}$

(2) $\frac{D \times 75}{S \times 2} \times \frac{100}{100}$

DS = 6
US = 4

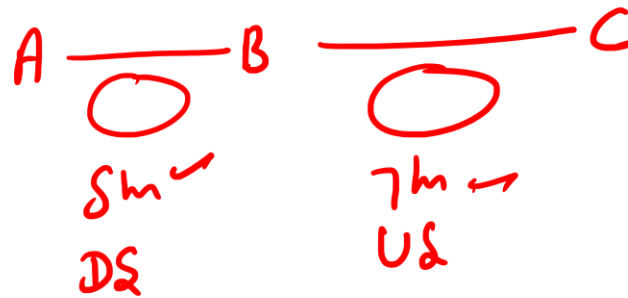
(3) $S \times 60\% = 3$
 $S + 3 = 8 = \frac{9}{8} \times 100 = 180\%$



Q.17) A boat travels from town A to town B and then goes from town B to town C. Going from town A the boat reached B which is ___ km away in 5 hours while travelling downstream. Then the boats leave town B for C which is ___ km away from town B and reaches town C after 7 hours while travelling upstream. The ratio of the speed of boat to speed of stream is 8:1. (Note – Assume the speed of boat and stream is constant for both journeys)

- I. 135 km, 147 km $45:49$
- II. 120 km, 147 km $40:49$
- III. 180 km, 196 km $45:49$

- [a] Only II
- [b] Only III
- [c] Both I and II
- [d] Both I and III
- [e] Both II and III



$\frac{\text{Speed of Boat}}{\text{Speed of Stream}} = \frac{8}{1}$
 DS US
 $8+1$ $8-1$
 $9 : 7$

Distance
 $S \times 9 = 7 \times 7$
 $45 = 49$



Q18. A boat running upstream takes 8 hours 48 minutes to cover a certain distance, while it takes 4 hours to cover the same distance running downstream. What is the ratio between the speed of the boat and speed of the water current respectively?

- A. 2 : 1
- B. 3 : 2
- C. 8 : 3
- D. 3 : 5
- E. 8 : 2

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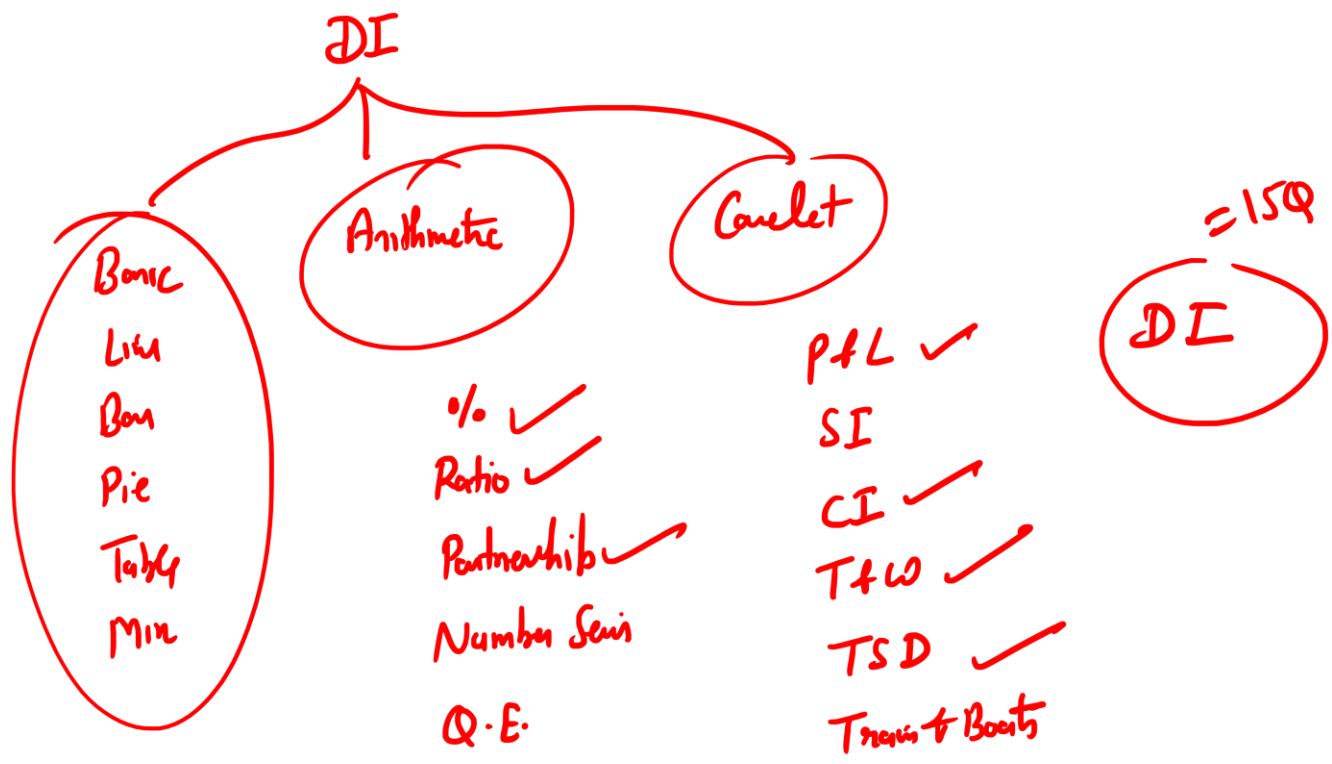


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2024 Jukt
2023 Jukt



Direction (1-5): Read the information and answer the following questions.

There are three manufacturers A, B and C manufacturing two products bags and bottles. The ratio of bags and bottles manufactured by A is 9:5 and the number of bags manufactured by B is 25% of bottles manufactured by A. Number of bottles manufactured by C is 1500. The number of bottles sold by A is equal to the least number of products manufactured from the shop A and B. The number of bags sold by B and C are equal and a perfect square of multiple of 5. The number of bags sold by B is $\frac{1}{5}$ th times the unsold bottles by B. Unsold bottles by B and C are same. Total number of unsold bottles by all the shops lies between (1000 - 3000).

Note -

- (i) Total product manufacture = Total product sold + total product unsold.
- (ii) Equal number of products manufactured by all the shops.
- (iii) The difference between bottle sold and unsold by A is 500.

	Bag			Bottles		
	M	Sold	Unsold	M	Sold	Unsold
A 14x 2800	9x 1800	y	=	5x 1000	1.25x 250	3.75x 750
B 14x 2800	1.25x 250	100 y	150	12.75x 2550	2050	5y 500
C 14x 2800	- 1300	100 y	1200	1500	1000	5y 500

} 1000-3000

Bot Sold by A = Least Man by A or B

$y = 25, 100, 225, 400, 625, \dots$

$$3.75x - 1.25x = 500$$

$$2.5x = 500$$

$$x = 200$$

$$750 + 10y = 1000 - 3000$$

$$10y = 250$$

$$y = 25$$

X

Q1. The ratio of product sold by A to B is 25:43 and unsold bags of A is 60% more than bags sold by D. If the unsold bags of D are 40% more than that of B, then find the total bags manufactured by D is what percentage of bottles sold by C.

- A. 71%
- B. 10%
- C. 171%
- D. can't be determined
- E. None of these

Handwritten solution for Q1:

$$\frac{m+250}{2150} = \frac{25}{43} \quad m+250 = 1250 \quad m = 1000$$

A Bag = 1000, UN = 800

(D) Bag = 710, S = 500, UN = 150+60 = 210

$\frac{710 \times 100}{1000} = 71\%$

Q2. If the ratio of total products sold to total bottles sold by all the shops is 4:3, then find the unsold Bags of A is what percentage of unsold bottles by B.

- A. 200%
- B. 180%
- C. 150%
- D. 100%
- E. None of these

Handwritten solution for Q2:

$$4400 = 3500 + m = 3300 \times 1100$$

$$4 = 3 \times 1100$$

$$\frac{900}{500} \times 100 = 180\%$$

Q3. The cost of each bag and each bottle is Rs(x) and Rs(x+10) and total revenue generated by C and A by selling is same i.e., 21000, then find the bags unsold by A.

- A. 50
- B. 100
- C. 200
- D. 150
- E. 1600

Handwritten solution for Q3:

For shop C: 100 bags at x, 1000 bottles at x+10. Revenue: $100x + 1000(x+10) = 21000$

For shop A: m bags at x, 20 bottles at x+25. Revenue: $m \times x + 20(x+25) = 21000$

Solving for x: $1100x = 11000 \Rightarrow x = 10$

Substituting x=10 into shop A's equation: $m \times 10 + 20(10+25) = 21000$

$$10m + 700 = 21000 \Rightarrow 10m = 20300 \Rightarrow m = 2030$$

Unsold bags of A = 2030 - 20 = 2010

Q4. If the number of defective bags sold by A is 20% more than the unsold bags by C. If the number of non-defective bags sold by A is 240 less than the bags unsold by A, then find the bags sold by A is how much more/less than bottles manufactured by C.

- A. 0
- B. 1000
- C. 1500
- D. 500
- E. None of these

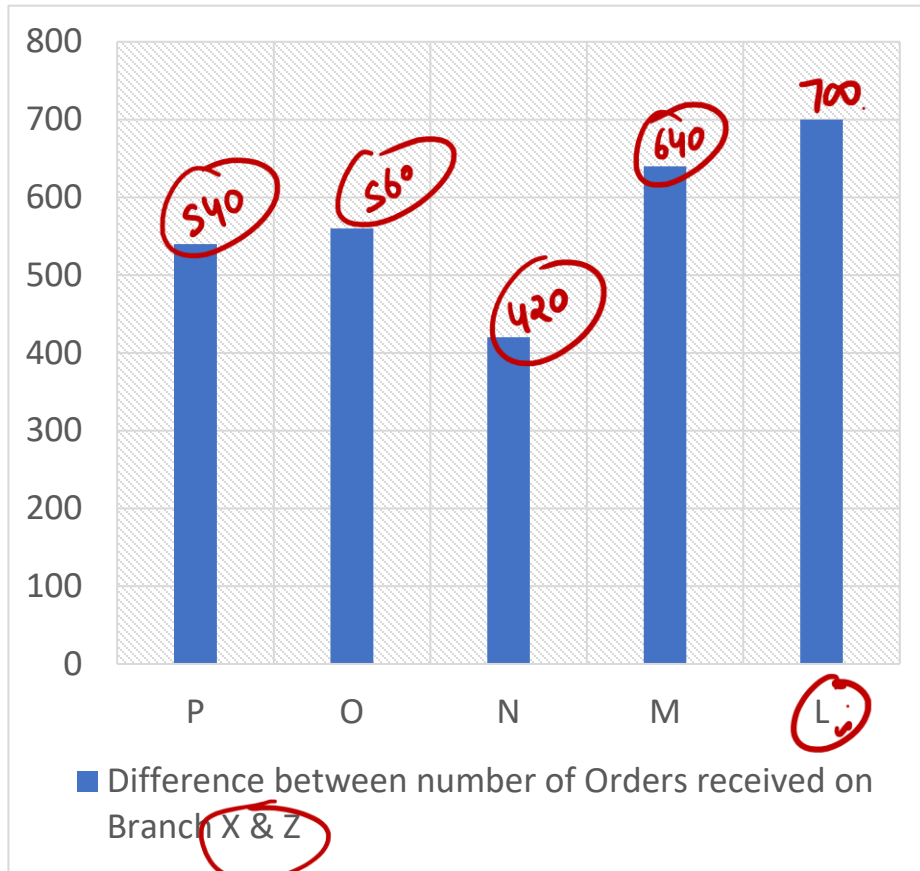
Q5. Find the ratio of average of total Bags Manufactured by A, B & C to the average of total unsold bottles of A, B & C.

- A. 67:35
- B. 65:32
- C. 67:41
- D. 61:31
- E. 71:37

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Direction (6-11): The bar graph given below shows the difference between number of orders received on branch X and Z of KFC which will delivered by five delivery men L, M, N, O and P. The table given below shows the ratio of orders received branch X, Y and Z of KFC. Read the data carefully and answer the questions given below.



Delivery Men	Ratio of order received on Branch X to Y (X: Y)	Ratio of Order received on Branch Y to Z (Y: Z)
L	$1:2$ $x: y = 3: 6: 10$	$3:5$ $x: y: z = 300: 600: 1000$
M	$2:1$ $2: 1: 3$	$1:3$ $1280: 640: 1920$
N	$3:1$ $3: 1: 5$	$1:5$ $630: 210: 1050$
O	$1:1$ $3: 3: 1$	$3:1$ $840: 840: 280$
P	$3:4$ $3: 4: 12$	$1:3$ $180: 240: 720$

$7 = 700$
 $1 = 100$
 $2 = 420$
 $1 = 210$
 $2 = 560$
 $1 = 280$
 $9 = 540$
 $1 = 60$



Q6. If the average number of orders delivered by M from all three branches is 'x', then find the value of $\frac{5x}{2}$.

$$x = \frac{1280 + 640 + 1920}{3} = \frac{3840}{3} = 1280$$

$$\frac{5x}{2} = \frac{5 \times 1280}{2} = 3200$$

- A. 3000
- B. 2000
- C. 3200
- D. 1800
- E. 3600

Q7. Total orders delivered by P of branch Y is what percent less than total orders delivered by M of branch X.

$$\frac{1940}{1280} \times 100 = 151.56\%$$

$$151.56\% - 100\% = 51.56\%$$

$$100\% - 51.56\% = 48.44\%$$

$$\approx 48.44\%$$

- A. 18.75%
- B. 72.25%
- C. 80.25%
- D. 81.25%
- E. 90.25%

Q8. The delivery cost of each order which delivered by O of branch Z is Rs x and delivery cost of each order which delivered by N of branch Z is Rs y. If the ratio of total amount received by O to deliver orders from Z to amount received by N to deliver orders from Z is 1:6 and total amount both received are Rs 49000, then find delivery cost of each order which delivered by O of branch Z and order which delivered by N of branch Z respectively.

- A. 25 & 40
- B. 15 & 18
- C. 20 & 32
- D. 30 & 48
- E. Can't be determined

Home Work



Q9. Find the difference between total orders delivered by L and P from all three branches.

- A. 660
- B. 760
- C. 720
- D. 740
- E. 860

$$\begin{array}{l} L=1900 \\ P=1140 \end{array} \Rightarrow \underline{760}$$

Q10. The ratio of orders delivered by N from branch Y to males and females is 5:2 respectively, while the ratio of orders delivered by O from all three branches to males and females is 7:3. Find the sum of orders delivered by N from branch Y to males and orders delivered by O from all three branches to females.

- A. 1522
- B. 648
- C. 728
- D. 738
- E. 718

Handwritten solution for Q10:

Let total orders for N be $Y = 210$.
 Ratio M:F = 5:2.
 M = $\frac{5}{7} \times 210 = 150$
 F = $\frac{2}{7} \times 210 = 60$

Let total orders for O be $X = 280$.
 Ratio M:F = 7:3.
 M = $\frac{7}{10} \times 280 = 196$
 F = $\frac{3}{10} \times 280 = 84$

Sum of orders for N (Males) and O (Females) = $150 + 84 = 234$ (Note: The handwritten calculation shows 150 + 84 = 234, but the final answer is 738, which is 3 times 246. There is a discrepancy in the handwritten work.)

Q11. Calculate the ratio of the total orders received by Branch X from delivery men L, M, N, O, and P to the total orders received by Branch Y from the same delivery men.

- A. 321:251
- B. 323:253
- C. 330:271
- D. 350:267
- E. 321:253

Home Work

Handwritten calculation for Q11:

$$\frac{196 \times 3}{10} = 588$$

$$\frac{150}{588} = 738$$

Directions: Following is the data regarding the revenue and expenditure of 4 companies in 2018 and in 2017. All figures are in Rs crore.

Profit = Revenue – Expenditure

Percentage profit = (Profit/Expenditure)*100%

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	2017		2018	
	Revenue	Expenditure	Revenue	Expenditure
Mckinsey	5800 <i>500</i>	5300 <i>500</i> $\frac{500}{53} \times 100 = 10\%$	6000 <i>1000</i>	5000 <i>20%</i>
BCG	6000 <i>600</i>	5400 <i>6</i> $\frac{6}{54} \times 100 = 11.1\%$	5600 <i>800</i>	4800 <i>1</i> $\frac{1}{6} = 16.66\%$
Bain	5000 <i>200</i>	4800 <i>2</i> $\frac{2}{48} \times 100 = 4.16\%$	5400 <i>600</i>	4800 <i>1</i> $\frac{1}{8} = 12.5\%$
ATK	4800 <i>800</i>	4000 <i>20%</i>	5000 <i>1000</i>	4000 <i>25%</i>



Q.12) Which company in which year has seen the maximum percentage profit?

- [1] ATK in 2017
- [2] BCG in 2017
- [3] Bain in 2018
- [4] ATK in 2018
- [5] Mckinsey in 2018

Q.13) Which company has seen the maximum percentage increase in profit from 2017 to 2018?

- [1] Mckinsey
- [2] BCG
- [3] Bain
- [4] ATK
- [5] 2 companies have the same percentage increase

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Q.14) What is the sum of the numerical values of the percentage profit of Mckinsey in 2018 and Bain in 2018?

- [1] 27.5
- [2] 25
- [3] 32.5
- [4] 38
- [5] 45



Q.15) What is the ratio of the numerical values of the percentage profit of Mckinsey in 2017 to BCG in 2017?

- [1] 45: 53
- [2] 41: 51
- [3] 47: 61
- [4] 38: 65
- [5] 33: 61

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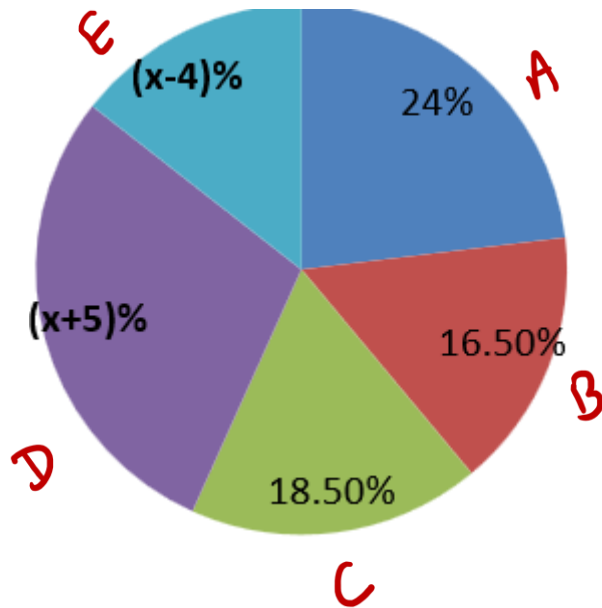
Q.16) For all 4 companies combined, what is the percentage (approximately) increase in the sum of their profits from 2017 to 2018?

- [1] 48%
- [2] 62%
- [3] 44%
- [4] 55%
- [5] 72%



Directions: Answer the questions based on the information given below.

Five different schools of a district participated in multiple tournaments during a year. Each school won some gold, silver and bronze medals. The pie chart given below shows the percentage distribution of number of gold medals won by each school out of total gold medals won by all schools together.



The table chart given below shows the difference between number of gold and number of silver medals, won by each school and percentage of number of bronze medals won by each school as percentage of number of silver medals won by that school.

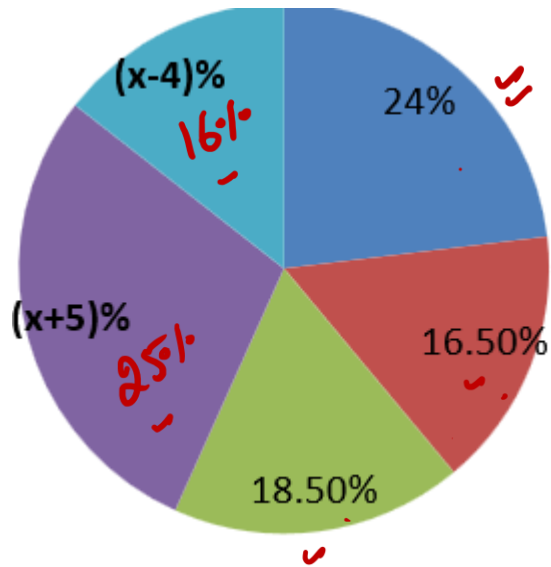
School	Difference between number of gold and number of silver medals won	Percentage of number of bronze medals won by each school as percentage of number of silver medals won
A	116	84%
B	186	78%
C	104	$(3.5x+1)\%$
D	120	75%
E	144	$4x\%$

Note: Total number of medals won by school 'E' were 86 more than that by school 'D'.



Directions: Answer the questions based on the information given below.

Five different schools of a district participated in multiple tournaments during a year. Each school won some gold, silver and bronze medals. The pie chart given below shows the percentage distribution of number of gold medals won by each school out of total gold medals won by all schools together.



A	96g ✓
B	66g
C	74g
D	100g =
E	64g ✓

Let total
Gold by all school
= 400g
1% = 4g

$$24 + 16.5 + 18.5 + x + 5 + x - 4 = 100\%$$

$$2x = 40\%$$

$$x = 20\%$$



The table chart given below shows the difference between number of gold and number of silver medals, won by each school and percentage of number of bronze medals won by each school as percentage of number of silver medals won by that school.

School	Difference between number of gold and number of silver medals won	Percentage of number of bronze medals won by each school as percentage of number of silver medals won
A	116 ✓✓	84%
B	186 ✓	78%
C	104 ✓	$(3.5x+1)\%$
D	120 ✓✓✓	75% ✓✓ $\frac{3}{4}$
E	144 ✓✓	4x% ✓ $\frac{80}{100}$

Note: Total number of medals won by school 'E' were 86 more than that by school 'D'.

Handwritten work for solving the problem:

Let the number of silver medals won by school 'E' be $100y$.

Then, the number of gold medals won by school 'E' is $100y + 144$.

The number of bronze medals won by school 'E' is $4x\%$ of $100y$, which is $4xy$.

Total number of medals won by school 'E' is $100y + 144 + 4xy$.

Total number of medals won by school 'D' is $120 + 75\% \times 100y = 120 + 75y$.

According to the note, the total number of medals won by school 'E' is 86 more than that by school 'D':

$$100y + 144 + 4xy = 120 + 75y + 86$$

$$25y + 4xy = 62$$

$$y(25 + 4x) = 62$$

Since y and x are integers, we check the factors of 62: 1, 2, 31, 62.

Case 1: $y = 1$, $25 + 4x = 62 \Rightarrow 4x = 37 \Rightarrow x = 9.25$ (Not an integer)

Case 2: $y = 2$, $25 + 4x = 31 \Rightarrow 4x = 6 \Rightarrow x = 1.5$ (Not an integer)

Case 3: $y = 31$, $25 + 4x = 2 \Rightarrow 4x = -23$ (Negative fraction)

Case 4: $y = 62$, $25 + 4x = 1 \Rightarrow 4x = -24$ (Negative fraction)

Therefore, the only valid solution is $y = 2$ and $x = 1.5$.

So, the number of silver medals won by school 'E' is $100 \times 2 = 200$.

The number of gold medals won by school 'E' is $200 + 144 = 344$.

The number of bronze medals won by school 'E' is $4 \times 1.5 \times 200 = 1200$.

Total number of medals won by school 'E' is $200 + 344 + 1200 = 1744$.

Total number of medals won by school 'D' is $120 + 75 \times 200 = 15120$.

The difference between the total number of medals won by school 'E' and school 'D' is $1744 - 15120 = -13376$.



$$\begin{array}{r} 264 \\ 186 \\ \hline 450 \\ 9 \\ \hline 486 + 2839 \\ \hline 150 \\ \hline 2 \end{array}$$

Schal	Gold	Silver		Brnze	Total
A	384	500	841.	420 ✓	1304 → 21% . —
B	264	450	781.	351	1065
C	296	400	711.	284 ✓	980 ✓
D	400	280	757.	210	890 ✓
E	256	400	807.	320 ✓	976
Total	1600	2030		1585	5215





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Q.17) Find the sum of number of bronze medals won by schools 'A' and 'C' together.

- [1] 816
- [2] 664
- [3] 704
- [4] 752
- [5] None of these

Q.18) Find the ratio between number of bronze medals won by school 'E' and sum of number of gold medals won by schools 'B' and 'C' together, respectively.

- [1] 3: 5
- [2] 4: 7
- [3] 2: 5
- [4] 5: 7
- [5] None of these

$$32p = 56p$$

$$\frac{4}{7}$$



Q.19) Find the average number of medals won by schools 'C' and 'D' together.

- [1] 925
- [2] 890
- [3] 915
- [4] 935
- [5] None of these

$$\frac{980 + 870}{2} = \frac{1870}{2} = 935$$

Q.20) Find the difference between number of silver medals won by school 'A' and school 'D'.

- [1] $12x - 45$
- [2] $8x + 45$
- [3] $9x + 20$
- [4] $12.5x - 15$
- [5] $11x$

HW



Q.21) If number of silver medals won by school 'B' were 'm' and number of gold medals won by school 'D' were 'n', then find the value of $3(m - n)$.

[1] 150

[2] 250

[3] 175

[4] 225

[5] 200

110

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