23 July 2023 08:42

Arithmetic

Speed time distance, profit/loss, time work, SI CI, century methods.

Shilpa took a loan of Rs. 15,00,000 to purchase a car. The company charges compound interest at 20% per annum. She promised to make the payment after three years. But for the last year of loan tenure, the company increased the rate of interest by 25% from the previous one. Then the extra amount which she had to pay is what per cent of the amount of loan taken by her?

(A) 8.3%

(B) 7.9%

(C) 8.7%

(D) 7.2%

$1500000 \times \frac{6}{8} \times \frac{6}{8} \times \frac{1}{20}$

$= 108000$

$\frac{108000}{1500000} \times 100$

$= 7.2\%$

Actual interest

$= 1500000 \times 1.2^2 \times 1.25$

Interest due

$= 1500000 \times 1.2^3$

Extra interest

$= 1500000[1.2^2 \times 1.25 - 1.2^3]$

$= 1500000 \times 1.2^2 \times 0.05$

There are three members in a family – husband, wife and their son. Husband's age is thrice his son's age and wife is three years younger than his husband. What is the respective ratio of ages of son, husband and wife if their average age is 41?

(A) 17 : 9 : 18

(B) 15 : 4 : 12

(C) 6 : 18 : 17

(D) 4 : 12 : 15

(E) None of these

Son – x

H – $3x$

W – $3x-3$

Total age $= 41 \times 3 = 123$

$7x - 3 = 123$

$7x = 126$

$x = 18$

18 : 54 : 51

6 : 18 : 17

There are 3 points P, Q and R in a straight line, such that point Q is equidistant from points P and R. A man can swim from point P to R downstream in 24 hours and from Q to P upstream in 16 hours. Find the ratio of speed of man in still water to speed of stream?

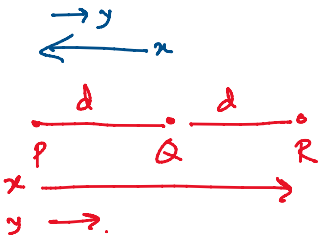
(A) 5 : 1

(B) 6 : 1

(C) 5 : 3

(D) 7 : 1 ✓

(E) None of these



Net speed upstream $= x - y$.

Net speed downstream $= x + y$.

$\text{time} = \frac{\text{distance}}{\text{speed}}$

$\frac{d}{x-y} = 16$ — (1)

$\frac{2d}{x+y} = 24$ — (2)

$\frac{2d/x+y}{d/x-y} = \frac{24}{16}$

$4x - 4y = 3x + 3y$

$x = 7y$

$\frac{x}{y} = \frac{7}{1}$

$\frac{x(x-y)}{x+y} = \frac{12 \times 3}{16 \times 4}$

Instead of normal weighing scale a shopkeeper used forged scale. He used 1.4 kg scale while buying and 840g scale while selling, what will his overall profit percentage, if in the end he offers 10% discount?

(A) 50% ✓

(B) 48%

(C) 40%

(D) 38%

(E) None of these

Buying

1400 gm for the price of 1000 gm.

Selling

840 gm for the price of 1000 gm.

CP = 1000 · 1400 gm.

Actual CP of 1 gm $= \frac{1000}{1400} = \frac{5}{7}$

" CP " 840 gm $= \frac{5}{7} \times 840^{120} = 600$

Actual SP $= 90\% \times 1000 = 900$

Profit % $= \frac{300}{600} \times 100 = 50\%$.

From 'A' kg of pure tea a shopkeeper removes A% of the mixture (Either pure tea or adulterated tea) and replaces it with same quantity of adulteration. If he repeated this process once more and now the amount of pure tea remaining in the mixture is (90% of 40% of A) kg, then find the value of A.

(A) 60%

(B) 50%

(C) 40%

(D) 30%

(E) None of these

$x = 60\%$.

10 kg $\rightarrow$ 10%.

$= 10[1 - 10\% + 60\% \times 10\%]$

$= 10[0.9 + 0.06]$

$= 10 \times 0.96 = 9.6$.

2nd. $9.6[1 - 10\% + 60\% \times 10\%]$

$A - A\% \times A$

$+ A\% \times A\% \times A$.

$= A[1 - A\% + A^2\%]$.

Pure tea.

A kg.

A%

A%. of

impurities mixed

x%. of pure tea

2nd $A[1 - A\% + A^2\%]^2 = A \times 0.9 \times 0.4$

$(1 - A\%)^2 = 0.9 \times 0.4$.

$= 0.36$.

$1 - A\% = 0.6$.

$A\% = 0.4$

A work is started by a man and it is assumed that he will finish the work in 11 days if working alone. Each subsequent day a new man joined the work. In how many days the four times the original work will be completed, if after the 8th day from the starting of the work no new man will be further added?

(A) 11

(B) 10

(C) 9

(D) 8

(E) None of these

original work = 1

Total work = $4 \times 1 = 4$

1 man → 11 days.

In 1 day → $\frac{1}{11}$ th

$\frac{1}{11} + \frac{2}{11} + \frac{3}{11} + \frac{4}{11} + \frac{5}{11} + \frac{6}{11} + \frac{7}{11} + \frac{8}{11}$ | $\frac{8}{11}$

1 2 3 4 5 6 7 8. (9)

$= \frac{\frac{8 \times 9}{2}}{11} = \frac{36}{11} = 3\frac{3}{11}$

$\frac{44}{11} - \frac{36}{11} = \frac{8}{11}$ left.

Ajeet purchased 100 books of quantitative aptitude for his book store. He sold 20% of total books at a profit of 10%, 37.5% of remaining at a profit of 15%, 80% of the remaining at a profit of 8% and remaining at a profit of 20%. If he sold all the books at a profit of 16% he would have gained Rs.1505 more, then find the cost price of each book.

(A) Rs. 250

(B) Rs. 375

(C) Rs. 350

(D) Rs. 450

(E) None of these

CP of each book = x.

Total CP = $100x$.

37.5% = $\frac{3}{8}$.

$\frac{3}{8} \times 80 = 30$

SP of 20 books → $1.1 \times 20x = 22x$.

SP of 30 " → $1.15 \times 30x = 34.5x$

$80\% \times 50 = 40$

SP of 40 " → $1.08 \times 40x = 43.2x$

Total SP = $111.7x$.

@ 16% profit SP = $116x$

SP of 10 " → $1.2 \times 10x = 12x$

$116x - 111.7x = 1505$

$4.3x = 1505$

$x = \frac{1505}{4.3} = \frac{15050}{43}$

350.

In an office some persons are officers and some are non-officer. The number of officers is 30. The average salary of officers is Rs.1040 and that of non-officers is Rs.400. If the average salary of entire staff in office (officers + Non – officers) is Rs.500 per month, then what is the average of total number of employees (officers + Non – officers) in the office?

(A) 49

(B) 89

(C) 92

(D) 96

(E) None of these

non officers = x.

total sal of off = 1040×30

" " " No = $400x$.

" " " all = $500(30+x)$

$1040 \times 30 + 400x = 500(30+x)$

$104 \times 3 + 4x = 5(30+x)$

$312 + 4x = 150 + 5x$

$x = 162$.

$\frac{162+30}{2} = 96$.

A, B, C, and D are four friends. In which B and C are brothers, 360 sweets are divided among them. A gets 200/3 % of B. B gets 40% of C and C gets 75% of D. Then what is the difference between the number of sweets received by brothers and the number of sweets received by others?

(A) 44

(B) 34

(C) 24

(D) 14

(E) None of these

$\frac{1}{5}D + \frac{3}{10}D + \frac{3}{4}D + D = 360$.

$4D + 6D + 15D + 20D = 360 \times 20$.

$45D = 360 \times 20$.

$D = \frac{360}{45} \times 8$

$D = 160$.

$A = \frac{160}{5} = 32$.

$B = \frac{3}{10} \times 160 = 48$.

$C = \frac{3}{4} \times 160 = 120$.

168

168 192

D

$C = \frac{3}{4} \times D$.

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

$= \frac{3}{10}D$.

$A = \frac{200}{300} \times B = \frac{2}{3} \times B$

$= \frac{2}{3} \times \frac{3}{10} D$

$= \frac{1}{5}D$.

In a school number of students in 6th and 7th class is in the ratio 6 : 11. If 60% of total students in class 6 are boys and 52% of total students in class 7 are boys, then find total girls in both the class together is approximately what percentage of total students in both the classes?

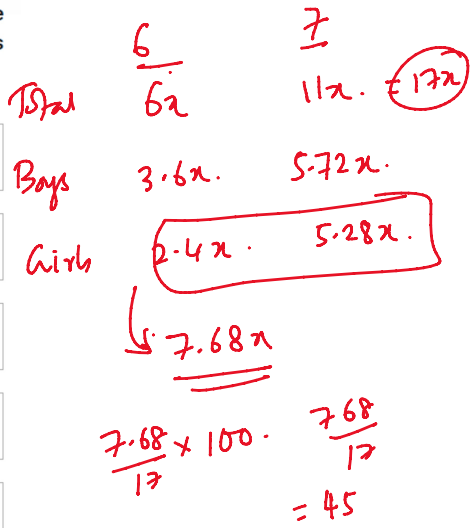
A) 39.4

B) 45.2

C) 49.9

D) 35.6

E) None of these



In a 1500 m race, Chaitali beats Vrunali by 100 m and in 1200 m race, Vrunali beats Krutika by 75 m. If Chaitali and Krutika are compared, then for how much m Chaitali will beat Krutika in 900 m race?

(A) 115 m

(B) 112.5 m

(C) 110 m

(D) 120 m

(E) 135 m

$\frac{S_C}{S_K} = \frac{8}{7}$.

Speed = Dist / time

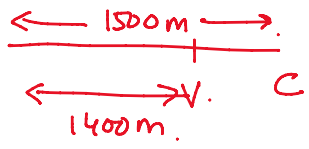
Speed $\propto$ Dist.

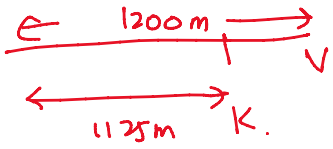
Ratio of speed = Ratio of distance

$\frac{8}{7} = \frac{S_C}{S_V} \times \frac{S_V}{S_K} = \frac{15}{14} \times \frac{1200}{1125}$

$\frac{S_C}{S_V} = \frac{15}{14}$

$\frac{S_V}{S_K} = \frac{1200}{1125}$





When C completes 800, K completes 700.

" " 1 " " $\frac{7}{8}$.

" " 900 " " $\frac{7}{8} \times 900$

$= 787.5$

900 − 787.5 = 112.5.

$= \frac{7}{8} \times 900$

112.5

Ajay walked 12 km to reach the station from his house. Then he boarded in a train and reached his destination. The average speed of the entire journey was 62 kmph and he took a total time of 6 hours. If the average speed of train was 120 kmph, then what is the ratio of walking speed of Ajay to the speed of train?

(A) 1 : 30

(B) 1 : 60

(C) 2 : 35

(D) 2 : 65

(E) None of these

$S_W = \frac{12}{t}$.

Avg speed = total dist / total time

Distance by train = 360

$t + \frac{360}{120} = 6$.

$t = 3$.

$S_W = \frac{12}{3} = 4$ km/hr.

$62 = \frac{\text{total dist}}{6}$

total dist = 62 × 6 = 372 km

$S_W : S_T$

$= 4 : 120$

$= 1 : 30$.