

Practice Work Book

Quantitative aptitude Mixed quiz

Q. 12 men can complete a work in 18 days. After 5 days 6 more men joined the work. In how many days will the remaining work be completed?

Solution:

Work done by 12 men in 5 days $\Rightarrow (12 \times 18)/1 = (12 \times 5)/x \Rightarrow x = 5/18$

Remaining work = $13/18$

Time taken by 12 + 6 men to do the remaining work $\Rightarrow (12 \times 18)/1 = (18 \times X)/(13/18) \Rightarrow X = 26/3$

Therefore time taken to complete the work is $8 \frac{2}{3}$ days.

Q. A sum of money is divided among A, B, C and D in the ratio 2 : 5 : 7 : 9. If the share of C is 3250 more than the share of A then what is the total amount of money of B and D together?

Solution:

Total share of B and D together = $Rs.(5 + 9)[3250/(7 - 2)] = 14 \times 3250/5 = Rs.9100$

Q. A starts a business with Rs. 30,000 and 4 months later B joins the business with Rs. 40,000. If the total profit is Rs. 5100 at the end of the year, find the share of A in the total profit?

Solution:

$A : B = 30000 \times 12 : 8 \times 40000 = 9 : 8$

$17x = 5100 \Rightarrow x = 300$

Therefore Share of A = $9x = 2700$

Q. If the cost of 12 chairs and 18 tables is Rs. 10440. Then what is the cost of 6 chairs and 9 tables?

Solution:

$12C + 18T = 10440 \Rightarrow 2C + 3T = 10440/6 = 1740$

Now multiplying both sides by 3 we get

$6C + 9T = 5200$

Q. The ratio of the father's age to the son's age is 4:1 respectively. If the product of their ages is 256 years. What will be the respective ratio of their ages after 5 years?

Solution:

Let the age of father and son be $4x$ years and x years respectively.

According to question, $4x \times x = 256 \Rightarrow x = 8$

After 5 years, Age of father = $(4 \times 8 + 5) = 37$ years

Son's age = $(8 + 5) = 13$ years

Therefore, Ratio = $37:13$

Q. The average age of Nitika and Kriti is 21 years. The ratio of their ages is 4:3 respectively. What is the present age of Kriti?

Solution:

Let present age of Nitika = $4x$ years and present age of Kriti = $3x$ years

According to question, $4x + 3x = 21 \times 2 \Rightarrow 7x = 42 \Rightarrow x = 6$

Present age of Kriti = $3x = 3 \times 6 = 18$ years

Q. The ratio of the present ages of Ram and Rahim is 4 : 5 and Ram is 12 years younger than Rahim. What will be the sum of their ages after 10 years?

Solution:

According to question Ram : Rahim = 4 : 5

Difference in ratio = 1 $\Rightarrow 1 = 12 \Rightarrow 9 = 108$

After 10 years the sum = $108 + 20 = 128$ years

Q. In how many different ways can the letters of the word "BOUNTY" be arranged?

Solution:

Required number of ways = $6! = 720$

Q. When a number is added to seven-ninth of thirty-five percent of 900, the resultant is 325. What is the number?

Solution:

Let number = x

$$900 \times 35\% \times \frac{7}{9} + x = 325$$

$$900 \times \frac{35}{100} \times \frac{7}{9} + x = 325$$

$$x = 325 - 35 \times 7 = 325 - 245$$

$$x = 80$$

Study the following information carefully to answer the questions given below-

A committee of 6 persons has to be formed from 4 teachers of Hindi, 5 teachers of Art and 3 teachers of Sanskrit.

Q. In how many different ways can the committee be formed, if -No teachers are included from Sanskrit stream.

Solution:

Required ways = ${}^9C_6 = 84$

Q. In how many different ways can the committee be formed, if Any teacher can be included in the committee?

Solution:

Required ways = ${}^{12}C_6 = 924$

Q. The total area of a circle and a square is 2611 cm² and the diameter of circle is 42 cm then what is the sum of circumference of circle and perimeter of square?

Solution:

Area of circle + Area of square = 2611cm²

$$\pi r^2 + a^2 = 2611$$

$$\frac{22}{7} \times 21 \times 21 + a^2 = 2611$$

$$a^2 = 1225$$

$$a = 35 \text{ cm.}$$

Sum of perimeters of circle and square =

$$2\pi r + 4a$$

$$= 2 \times \frac{22}{7} \times 21 + 4 \times 35$$

$$= 132 + 140 = 272 \text{ cm.}$$

Q. Train A crosses a stationary train B in 45 seconds and crosses a pole in 20 seconds at the same speed. The length of train A is 200 meter. What is the length of stationary train B?

Solution:

Let the length of stationary train B is x meter.

According to question,

$$\frac{x + 200}{45} = \frac{200}{20}$$

$$x + 200 = 10 \times 45$$

$$x = 250 \text{ meter}$$

Q. There are three taps in a water tank. The tank fills in 4 hours by opening tap A and 6 hours by opening tap B and by opening only tap C it empties in 3 hours. How much time will be required to fill the tank by opening all taps A, B and C simultaneously?

Solution:

According to the question $\frac{1}{4} + \frac{1}{6} - \frac{1}{3} = (3 + 2 - 4)/12 = 1/12$

Therefore required time = 12 hours

Q. In a class of 150 students there are 80 boys and 70 girls. The average marks obtained by the class is 78. If the average marks obtained by boys and girls are in the ratio 3:4, find the average marks obtained by the girls.

Solution:

Let the average marks obtained by the boys and the girls be 3p and 4p.

It is given that Average = 78

$$\Rightarrow [(80 \times 3p) + (70 \times 4p)]/[80 + 70] = 78 \Rightarrow 520p/150 = 78 \Rightarrow p = 22.5$$

Hence the average marks obtained by the girls = 4p = 90

Q. A, B, C can finish a work in 24, 9, 12 days respectively. B and C start the work but are forced to leave after 3 days. Find out how many days will be taken by A to finish the remaining work?

Solution:

Work done by B and C together in one day = $(1/9 + 1/12) = 7/36$

Hence work done by B and C in 3 days = $3 \times (7/36) = 7/12$

Remaining work = $1 - 7/12 = 5/12$

Now, $1/24$ units of work is done by A in one day.

So for $5/12$ units of work, A will take = $5/12 \div (1/24) = 24 \times 5/12 = 10$ days

Q. Ram sold an article at a profit of 10%. If he had bought the article at 10% less price and sold it for Rs.10 less than the previous selling price then he would have got a profit of 20%. What is the cost price of the article?

Solution:

Let the CP of the article be Rs.100a

So the selling price = Rs.(100a x 1.1) = Rs.110a

Now the reduced cost price = Rs.(100a x 0.9) = Rs.90a

And the new selling price = Rs.(110a - 10)

Profit in this case = 20%

$$\Rightarrow [(110a - 10 - 90a)/90a] \times 100 = 20 \Rightarrow (2a - 1)/90 = 0.2 \Rightarrow a = 5$$

Hence the CP = Rs.500

Q. Ajay covers one third off a certain distance at a speed of 20kmph, one fourth of the distance at 30kmph and the remaining distance at a speed of 50kmph. What was his average speed during the journey?

Solution:

Let the total distance be 12a km

One third of total distance is covered at a speed of 20km

Hence time taken $T_1 = 4a/20 = a/5$ hour

Similarly $T_2 = 3a/30 = a/10$ hour

And $T_3 = 5a/50 = a/10$ hour

Average speed = Total distance / Total time = $12a/(a/5 + a/10 + a/10) = 12/(2/5) = 30$ kmph

Q. Rs.2420 were divided among A, B, C so that A : B = 5 : 4 and B : C = 9 : 10. Then what amount will C get?

Solution:

Given A : B = 5 : 4 and B : C = 9 : 10

$$\Rightarrow A : B : C = (5 \times 9) : (4 \times 9) : (4 \times 10) = 45 : 36 : 40$$

So C's share = $2420 \times 40/(45 + 36 + 40) = 2420 \times 40/121 = \text{Rs.}800$

Q. What is the total interest obtained on a sum of Rs.5000 at a rate of 10% for 2 years when the interest is compounded semi-annually?

Solution:

Here the interest rate = $10/2 = 5\%$

And total time period = $2 \times 2 = 4$

So the total amount that we will get at the end of 2 years = $5000 (1 + 0.05)^4 = \text{Rs.}6077$ (approx.)

So the total interest obtained = $\text{Rs.}(6077 - 5000) = \text{Rs.}1077$

Q. In how many ways 7 consonants and 3 vowels can be arranged so that all the vowels remain together?

Solution:

In this case we assume all the vowels as a single entity

So now we have 8 total entities

The number of ways in which we can arrange all these letters = $8!$

The number of ways in which we can arrange the three vowels = $3!$

So the total number of ways = $8! \times 3!$

Q. A box contains 2 blue caps, 4 red caps, 5 green caps and 1 yellow cap. If two caps are picked at random, what is the probability that at least one is red?

Solution:

Total caps are 12 out of which 4 are red

Required probability = $P(\text{one red}) + P(\text{both red}) = \frac{4C1 \times 8C1 + 4C2}{12C2} = \frac{38}{66} = \frac{19}{33}$

Q. The cost of 5 kg of apples is Rs.450. The cost of 12 dozen mangoes is Rs.4320 and the cost of 4kg of oranges is Rs.240. What is the total cost of 8 kg of apples, 8 dozens of mangoes and 8kg of oranges?

Solution:

Cost of 1kg of apples = $450/5 = \text{Rs.}90$

Cost of 1 dozen of mangoes = $4320/12 = \text{Rs.}360$

Cost of 1kg of oranges = $240/4 = \text{Rs.}60$

The total cost of 8kg apples, 8 dozen of mangoes and 8kg of oranges = $90 \times 8 + 360 \times 8 + 60 \times 8 = \text{Rs.}4080$

Q. 4 women and 6 man can finish a task in $2 \frac{6}{7}$ days and 5 women and 3 men can finish the same work in 4 days. In how many days 10 women and 12 men working together will finish the same task?

Solution:

Let the number of days taken by a man and a woman to finish the work on their own be m and w days respectively and let the total work be 1 unit.

According to the first condition $4/w + 6/m = 7/20$ ----- (i)

According to the second condition $5/w + 3/m = 1/4$ ----- (ii)

Solving these two equations we get $w = 40$ and $m = 24$

Now total work done by 10 women and 12 men in one day = $10/40 + 12/24 = 3/4$

So the total work will be completed in = $1/(3/4)$ days = $4/3$ days = $1 \frac{1}{3}$ days

Q. A Sphere of copper with radius 3cm is shaped and drawn into a wire of diameter 0.2cm. What is the length of the wire?

Solution:

Let the length of the wire be L.

When we reshape an object the volume remains constant

Volume of sphere = $(4/3) \pi 3^3$

Now diameter of the wire = 0.2cm

Hence the radius of the wire = 0.1cm

Volume of the wire = $\pi (0.1)^2 L$

Hence $(4/3) \pi 3^3 = \pi (0.1)^2 L \Rightarrow L = 3600\text{cm} \Rightarrow L = 36\text{m}$

Q. Ankita's age is three times the sum of the ages of her two children. After four years her age will be twice that of the sum of the ages of her two children. What is Ankita's present age?

Solution:

Let the sum of the present age of her two children be a years.

Then Ankita's age = $3a$

After 4 years her age will be $(3a + 4)$ years.

According to the given condition, $3a + 4 = 2(a + 8) \Rightarrow 3a + 4 = 2a + 16 \Rightarrow a = 12$

Ankita's present age = $3 \times 12 = 36$ years

Q. A can run one full round of a circular track in 6 minutes and B can run the same in 8 minutes. If both of them start simultaneously from the same starting point, then how many times will they meet at the starting point in 4 hours?

Solution:

The first time when A and B will meet at the starting point = LCM (6, 8) = 24 minutes

They will meet every 24 minutes at the starting point.

So total number of times when they will meet in 240 minutes = $240/24 = 10$ times

Q. A man purchases two watches at Rs.665. He sells one at 20% profit and other at 15% loss. Then neither gains nor losses, find the cost price of each watch.

Solution:

Let the cost of 1st watch be Rs.P then the cost of 2nd watch = $665 - P$

According to the given condition, $1.2P + 0.85(665 - P) = 665$

$\Rightarrow 0.35P = 665 \times 0.15 \Rightarrow P = 285.$

Q. Charlie goes from Pune to Mumbai for shopping as Mumbai is 50% cheaper than Pune for shopping. He travels by train whose fare is Rs.245 on either side. He does a shopping of Rs.1470 and returns. How much percent money did he save y coming to Mumbai?

Solution:

He did a shopping of Rs.1470. Hence he saves Rs.1470. But he travelled by train which cost him Rs.490 (both ways)

Thus actual savings = $1470 - 490 = 980$

Savings % = $980/2940 \times 100 = 33.33\%$

Q. In a bag, there are 25P, 50P and 1 Rs. Coins are in the ratio 2 : 1 : 3. If there total are Rs.100 in all, how many 25P, 50P and Rs.1 coins are there in the bag?

Solution:

Let the number of 25P, 50P and Rs.1 coins be $2n$, n and $3n$ respectively.

$0.25 \times 2n + 0.5 \times n + 3n = 100 \Rightarrow 4n = 100 \Rightarrow n = 25$

Now number of 25P coins = $2 \times 25 = 50$

Now number of 50P coins = 25

Now number of Rs.1 coins = $3 \times 25 = 75$

Q. Ajay makes a profit of Rs.110 if he sells a certain number of pencils he has at the price of Rs.2.5 per pencil and incurs a loss of Rs.55 if he sells the same number of pencils for Rs.1.75 per pencil. How many pencils does Ajay have?

Solution:

Let the number of pencils with Vinod be P

Let the Cost Price of P pencils be CP

$2.5P - CP = 110$ and $1.75P - CP = -55$

Solving the above two equations we get $P = 220$

Q. A finishes a work in 7 days, B finishes the same job in 8 days and C in 6 days. They turns to finish the work. A on first day, B on the second day and C on the third day and then again A and so on. On which day will the work get over?

Solution:

Work done by A on first day = $1/7$

Work done by B on second day = $1/8$

Work done by C on third day = $1/6$

Portion of the work done after 3 days = $1/7 + 1/8 + 1/6 = 73/168$

Work done after 6 days = $2 \times 73/168 = 146/168$

Remaining work = $22/168 = 11/84$

Work done on 7th day by A = $1/7 = 12/84$

Since $12/84 > 11/84$, work will get completed on 7th day

Q. A rectangular pool 20 meters wide and 60 meters long is surrounded by a walkway of uniform width. If the total area of the walkway is 516 sq meters, how wide, in meters is the walk way?

Solution:

Let the width of the walkway be x meter

Then $(20 + 2x)(60 + 2x) = 516 + 1200$

$\Rightarrow 4x^2 + 160x - 516 = 0 \Rightarrow x = 3, -43$

Since width > 0 , width of walkway = 3 meters

Q. A man bought some apples of which 13% of them were rotten. He sold 75% of the balance and was left with 261 apples. How many apples did he have originally?

Solution:

Let the total apples be n

13% are rotten, 25% of the rest = 261

$261 = (1 - 0.13) \times 0.25n \Rightarrow 0.2175n = 261 \Rightarrow n = 1200$

Q. 2 dice are thrown. What is the probability the product of the 2 numbers is less than 8?

Solution:

Total outcomes = $6 * 6 = 36$

Product = 1 $\Rightarrow (1,1)$

Product = 2 $\Rightarrow (1,2),(2,1)$

Product = 3 $\Rightarrow (1,3),(3,1)$

Product = 4 $\Rightarrow (1,4),(2,2),(4,1)$

Product = 5 $\Rightarrow (1,5),(5,1)$

Product = 6 $\Rightarrow (1,6),(2,3),(3,2),(6,1)$

Product = 7 => Not possible

Required probability = $14/36 = 7/18$

Q. Several liters of acid were drawn off from a 54 litre vessel, full of acid and equal amount of water was added. Again the same volume of the mixture was drawn off and replaced by water. As a result now, the vessel contained 24 litres of pure acid. How much of the acid was drawn off initially?

Solution:

Let a container contains x unit of liquid and y units of liquid is taken out from it. If this operation is repeated n times, then the final quantity of the liquid in the container is:

$$x [1-(y/x)]^n$$

$$\text{So, } 54 (1-y/54)^2 = 24$$

$$(1-y/54)^2 = 4/9$$

$$\text{Or } y = 18$$

So, 18 litres is the required answer

Q. Two persons are walking in the same direction at speeds 3km/hr and 6 km/hr. A train comes running from behind and passes them in 9 and 10 seconds. The speed of the train is _____.

Solution:

Let the speed of the train be S km/hr

$$\text{Relative speed while crossing first person} = (S-3) \text{ km/hr} = (5/18)(S-3) \text{ m/s}$$

$$\text{Length of the train} = (5/18) \times (S-3) \times 9$$

$$\text{Relative speed while crossing second person} = (S-6) \text{ km/hr} = (5/18)(S-6) \text{ m/s}$$

$$\text{Length of the train} = (5/18) \times (S-6) \times 10$$

Equating both the equations,

$$9S - 27 = 10S - 60$$

$$S = 33 \text{ km/hr}$$

Q. Ajith is three times as old as his sister, and his mother 8 times as old as his sister. In 10 years time, Ajith's mother will be twice his age. How old will Ajith's mother be when she is 6 times the age of his sister?

Solution:

Let Ajith, his sister, mother have age as A, S, M

$$A=3S, \text{ and } M = 8S$$

$$\text{Or } M = 8A/3$$

$$\text{Given } (M+10) = 2 (A+10)$$

$$\text{Or } 8A/3 + 10 = 2A + 20$$

$$2A/3 = 10 \text{ or } A = 15$$

So, current ages are: 15, 5, 40

Different between mother and sister = 35

So, mother will be 6 times his sister when sister is $35/5 = 7$ years old

Then, Ajith's mother will be 42 years.

Q. Ramu planned to divide his wealth to his children Ashok, Beema, and Chanakya in the ratio 4 : 5 : 7 respectively. He later included his wife, and the new ratios of his Wife, Ashok, Beema, and Chanakya were 13 : 9 : 6 : 4. If Chanakya's share now Rs. 250 less than the earlier share, how much wealth does Ramu have?

Solution:

Let wealth = W

Initial share for Chanakya = $7W/16$

New share = $4W/32 = W/8$

Given: $7W/16 - W/8 = 250$

$$5W/16 = 250$$

Or, $W = 800$

Q. A merchant mixes 15 kg of wheat costing Rs.12 per kg with 10 kg of wheat of another kind. Find the cost of second type of wheat when the cost of mixture per kg is Rs,14 per kg?

Solution:

Let the cost of second type of wheat per kg be Rs.P

Cost price of 15kg of first type wheat = $12 \times 15 = \text{Rs.}180$

Cost price of 10kg of second type wheat = $\text{Rs.}10P$

Cost of mixture per kg = $\text{Rs.}14$

$$\Rightarrow (10P + 180)/25 = 14 \Rightarrow 10P + 180 = 25 \times 14 \Rightarrow 10P = 350 - 180 = 170 \Rightarrow P = 17$$

Q. A can finish a piece of work in 20 days and A and B together can complete the same work in 12 days. If B is working at 150% of his efficiency and A is working at 50% of his efficiency, how much time will both of them working together take to complete the same work?

Solution:

$$1/20 + 1/B = 1/12 \Rightarrow B = 30$$

B is working at 150% of his efficiency and A at 50% of his efficiency

Then work completed by them in one day = $0.5/20 + 1.5/30 = 1/40 + 1/20 = 3/40$

Hence they will take $40/3$ days = $13 \frac{1}{3}$ days

Q. 20 men working 8 hours a day take 20 days to build a bridge. After 12 days, if 12 people uit, then how many more days will it take to build the bridge?

Solution:

Total work = $(20 \times 8 \times 20)$ man-hours = 3200 man-hours

Work completed in 12 days = $20 \times 12 \times 8 = 1920$ man-hours

Now remaining work = $3200 - 1920 = 1280$ man-hours

Now only 8 men are working to build the bridge

Let the remaining work be finished in D days

Hence $8 \times D \times 8 = 1280$ man-hours

=> $D = 20$ days

Q. A sum of money invested at simple interest amounts to Rs.8500 in three years and Rs.9350 in five years. What is the principal amount and rate of interest (approx.)?

Solution:

Simple interest that we get in each year remains the same

So let's assume Principal Amount invested is Rs.P and interest of one year is Rs.A

Hence according to the question $P + 3A = 8500$ and $P + 5A = 9350$

Then solving we get $P = \text{Rs.}7225$ and $A = \text{Rs.}425$

Hence rate of interest = $100 \times 425/7225 = 5.88\% = 5.9\%$ (approx.)

Q. A sum of Rs.6000 is borrowed at 10% pa compounded interest and paid back in three equal annual instalments. What is the approximate amount of each instalment?

Solution:

Suppose the value of every instalment is Rs.P

If an amount P is compounded at interest rate of R for T years then the total amount = $P(1 + R/100)^T$

Total amount to be paid = $6000(1 + 10/100)^3$

Now when a person is giving first instalment of Rs.P at the end of 1st year it means on that amount compounded interest will be applicable for 2 years. Similarly for 2nd instalment compounded will be applicable for 1 year.

So, $P(1 + 10/100)^2 + P(1 + 10/100) + P = 6000(1 + 10/100)^3$

=> $3.31P = 7986$ => $P = 2412 = \text{Rs.}2400$ (approx.)

Q. There are two bags on a table Bag one contains 8 red coloured pens and 5 yellow coloured pens. Bag two contains 5 red and 3 yellow coloured pens. If one pen is selected from the bags then find the probability that it is a red one?

Solution:

Probability of selecting a bag is $\frac{1}{2}$

Probability of getting one red pen = $\frac{1}{2} \times \frac{8}{13} + \frac{1}{2} \times \frac{5}{8} = \frac{1}{2} \times \frac{129}{104} = \frac{129}{208}$

Q. If all the letters of the word "EDUCATION" are permuted and all possible words are formed then in how many words do the vowels occupy odd places?

Solution:

In the given word there are five different vowels and 4 different consonants

There are 9 letters so there are 5 odd and 4 even places

5 vowels can be arranged in 5 places in 5! Ways and 4 consonants can be arranged in 4 places in 4! Ways.

Hence required number of ways = $5! \times 4! = 120 \times 24 = 2880$

Q. Sumit gives Ankit a head start of 10 meter in 100 meter race and still beats him by 15 meter. If Sumit completes a 200 meter race in 25 seconds, how much time will Ankit take to complete 100 meter race? Assume their speed remains constant.

Solution:

Sumit gives Ankit a head start of 10 meters and still beats him by 15 meter means when Sumit is at 100m mark Ankit is at 85 meter mark only.

It means the time in which Sumit completes 100m and Ankit is able to complete $85 - 10 = 75$ m

Hence the ratio of their speeds = $100 : 75 = 4 : 3$

Since Sumit runs 200 meter in 25 seconds, his speed = $(200/25) = 8$ m/s

Therefore Ankit's speed = $8 \times \frac{3}{4} = 6$ m/s

Time taken by Ankit to complete 100m race = $100/6 = 16.67$ seconds

Q. Car A travels from Delhi to Mumbai at an average speed of 50 kmph. At what speed should it return from Mumbai to Delhi such that the average speed of the entire journey is 75kmph?

Solution:

Let the distance between Delhi and Mumbai be x km.

If the average speed for the entire journey is 75kmph, the time taken to cover the distance = $2x/75$ hours

Time taken for going from Delhi to Mumbai = $x/50$ hours

Let's assume the speed of the Car while returning from Mumbai to Delhi was P kmph

Hence time taken to travel the distance = x/P hours

$$x/50 + x/P = 2x/75 \Rightarrow 1/50 + 1/P = 2/75 \Rightarrow 1/P = 2/75 - 1/50 = 1/50$$

Therefore $P = 150$ kmph

Q. If 36 men can dig a trench 200 m long, 3 m wide and 2 m deep in 6 days working 10 h a day, then in how many days, working 8 h a day will 10 men dig a trench 100 m long, 4 m wide and 3 m deep?

Solution:

According to the question,

Since, $M_1 \times D_1 \times T_1 \times W_2 = M_2 \times D_2 \times T_2 \times W_1$

$36 \times 6 \times 10 \times 1200 = 10 \times D_2 \times 8 \times 1200 \Rightarrow D_2 = 27$ days

Q. If a student walks from his house to school at 5 km/hr, then he is late by 30 minutes. However, if he walks at 6 km/hr, then he is late by 5 minutes only. What is the distance of his school from his house?

Solutions:

If the required distance be x km, then

$x/5 - x/6 = (30 - 5)/60 \Rightarrow (6x - 5x)/30 = 25/60 = 5/12 \Rightarrow x = 30 \times 5/12 = 12.5$ km

Q. Neha gave Rs.1200 on loan. Some amount he gave at 4% per annum simple interest and remaining amount at 5% per annum simple interest. After two years, she got Rs.110 as interest, then the amounts given at 4% and 5% per annum simple interest are, respectively

Solution:

Let the amount given at 4% per annum be Rs. x .

Therefore, Amount given at 5% per annum = Rs.(1200 - x)

Therefore $\frac{x \times 4 \times 2}{100} + \frac{[(1200-x) \times 5 \times 2]}{100} = 110 \Rightarrow \frac{-2x+12000}{100} = 110 \Rightarrow x = \text{Rs. } 500$

Also $(1200 - x) = 1200 - 500 = \text{Rs. } 700$

Q. The ratio between the rates of travelling of Anil and Sunil is 2 : 3 and therefore Anil takes 10 minutes more than the time taken by Sunil to reach a destination. If Anil had walked at double the speed, then he would have covered the distance in

Solution:

Time taken by Sunil = x minutes.

Time taken by Anil = $(x + 10)$ minutes.

Therefore $\frac{2}{3} = \frac{x}{x+10} \Rightarrow x = 20$ minutes.

Therefore, Time taken by Anil = 30 minutes.

Therefore, Time taken by Anil when he doubles his speed = $30/2 = 15$ minutes.

Q. Monika buys a fridge at 15/16 of its original value and sells it for 10% more than its value, then gain per cent is :

Solution:

Let the Original value of fridge be Rs. x

Then, Cost price = Rs.15/16 x

$$\text{Selling price} = \frac{110}{100} \times x = \text{Rs.} \frac{110x}{100}$$

$$\text{Therefore Gain per-cent} = \left[\frac{\frac{110x}{100} - \frac{15}{16}x}{\frac{15}{16}x} \times 100 \right] \% = 17.33\%$$

Q. Four boys and three girls stand in queue for an interview. The probability that they will stand in alternate position is —

Solution:

Total number of possible arrangement for 4 boys and 3 girls in a queue = 7!

When they occupy alternate position the arrangement would be like [B G B G B G B]

Thus, total number of possible arrangements for boys = 4 × 3 × 2 and for girls = 3 × 2

$$\text{Therefore, Required probability} = \frac{4 \times 3 \times 2 \times 3 \times 2}{7!} = \frac{4 \times 3 \times 2 \times 3 \times 2}{7 \times 6 \times 5 \times 4 \times 3 \times 2} = \frac{1}{35}$$

Q. A person started his journey in the morning. At 11 A.M, he covered 3/8 th of his journey and on the same day at 4 : 30 P.M, he covered 5/6 th of his journey. At what time did he start his journey?

Solution:

In 5 1/2 hours, the man covers (5/6 - 3/8)th of his journey.

Let the total distance be x.

So, in 11/2 hours, the man covers a distance of 11x/24 Km

$$\text{Speed} = \text{Distance/Time} = (11x/24)/(11/2) = x/12 \text{ Km/hr}$$

Now, we have to find the time taken by the man to cover, 3/8th of his journey

$$\text{Time} = 3x/8 \times 12/x = 4 \frac{1}{2} \text{ hours}$$

Hence, the man started his journey at 6 : 30 A.M

Q. A person increases his speed by 10 Km/hr and reaches 2 hours earlier. If he decreases his speed by 5 Km/hr, then he will reach 3 hours late. Find the speed and distance.

Solution:

Let D be the distance and S be the speed.

$$D/S - D/(S + 10) = 2 \Rightarrow D \times 10/S(S + 10) = 2 \dots\dots(i)$$

$$D/(S-5) - D/S = 3 \Rightarrow D \times 5/S(S - 5) = 3 \dots\dots(ii)$$

$$(i)/(ii) \Rightarrow (S - 5)/(S + 10) = 1/3 \Rightarrow 3S - 15 = S + 10 \Rightarrow 2S = 25 \Rightarrow S = 12.5 \text{ Km/hr}$$

$$\text{Therefore, } D = 2 \times 12.5 \times 22.5/10 = 56.25 \text{ Km.}$$

Q. A man takes 80 days to complete a job. Four men, 8 women and 4 machines take 5 days to complete the job. Four men, 1 woman and 2 machines take 10 days to complete the job. Find the time taken by a woman to complete the job (in days).

Solution:

Let the cost price of the article be x

$$112x/100 + 3.60 = 118x/100 \Rightarrow 6x/100 = 3.60$$

Therefore, x = 60 Rs

Q. 24 men can complete a work in 16 days. 32 women can complete the same work in 24 days. 16 men and 16 women started working and worked for 12 days. How much part of work is now left to complete?

Solution:

$$\text{Work done by 16 men in 12 days} = (16 \times 12)/(16 \times 24) = 1/2$$

$$\text{Work done by 16 woman in 12 days} = (16 \times 12)/(32 \times 24) = 1/4$$

$$\text{Total work completed} = 1/2 + 1/4 = 3/4$$

$$\text{Remaining work} = 1 - 3/4 = 1/4$$

Q. Mohan makes a profit of X%, by selling a pen for Rs 24. Had the cost price and the selling price been interchanged, it would have led to a loss of 62.5% of X. With the latter Cost Price, what should be the new selling price to get a profit of X%?

Solution:

Let the CP of the Pen be S

$$\text{sp} = 24 \text{ given}$$

$$\text{Profit} = X = (24 - S)/S \times 100 \dots (1)$$

Now the CP and SP of the Pen is interchanged

$$\text{New CP} = 24$$

$$\text{New SP} = S$$

$$\text{Loss} = (24 - S)/24 \times 100$$

$$\text{Given that, loss} = 62.5\% \text{ of } X = 62.5 \times (24 - S)/S \dots (\text{Substituting the value of } X \text{ from } 1)$$

$$\text{This implies, } (24 - S)/24 \times 100 = 62.5 \times (24 - S) / S$$

$$\text{Solving, we get } S = 15$$

Now, we have to find the value of X

Substitute X in (1)

$$\text{We get } X = 9/15 \times 100 = 60\%$$

With CP = 24, and profit % = 60

The SP should be $24 \times 160/100 = \text{Rs } 38.40$

Q. A boy starts to paint a fence on one day. On the second day, two more boys join him. On the third day, three more boys join the group, on the fourth day, four more boys join the group and so on. If the fence is completely painted this way in exactly 20 days, then find the number of days in which 10 men painting together can paint the fence completely. Given that every man can paint twice as fast as a boy can.

Solution:

Total number of days taken by a boy = $1 + (1 + 2) + (1 + 2 + 3) + \dots + (1 + 2 + 3 + \dots + 20)$

Total number of days taken by a boy = $1/6 \times 20 \times 21 \times 22 = 1540$

As efficiency of a man is double that of a boy, the number of days taken will be, $1540/2 = 770$

1 man =====> 770 days

10 men =====> 77 days

Q. Two pipes can fill a tank in 20 hours and 24 hours respectively. A third pipe can empty the tank in 40 hours. If all the three are opened and function simultaneously then, in how much time, will the tank be full?

Solution:

The total time taken by the three pipes will be $1/20 + 1/24 - 1/40 = 8/120 = 1/15 = 15 \text{ hrs}$

Q. Three numbers are in the ratio 3 : 4 : 5 and their LCM is 2400. Their HCF is

Solution:

Let the numbers be $3x$, $4x$ and $5x$

lcm of these three numbers = $60x$

$60x = 2400$

$x = 40$

The numbers are (3×40) , (4×40) , (5×40)

Hence hcf = 40

Q. A, B and C start at the same time in the same direction to run around a circular stadium. A completes a round in 252 seconds, B in 308 seconds and C in 198 seconds, all starting at the same point. After what time will they meet again at the starting point?

Solution:

LCM of 252, 308 and 189 = 2772 seconds

2772 sec = 46 min 12 sec

Q. A certain sum of money amounts to Rs.4800 in 5 years at 4% per annum. In how many years will it amount to Rs.16000 at the same rate?

Solution:

$$\text{Principal} = (100 \times 4800) / (100 + 20) = 4000$$

$$\text{Again, } 4000 = (100 \times 16000) / (100 + t_1) \Rightarrow t_1 = 75 \text{ years.}$$

Q. What is the compound interest on Rs.16000 for 3 years if the rate of interest is 5% for the first year, 10% for the second year and 25% for the third year?

Solution:

$$\text{CI} = 16000 (1 + 5/100) (1 + 10/100) (1 + 25/100) - 16000 = 7100.$$

Q. A man can swim at 16km/h in still water. If the river is running at 5km/h, it takes 10hrs more in upstream than to go downstream for the same distance. How far is the place?

Solution:

Let, distance = x km

$$x / (16 - 5) - x / (16 + 5) = 10$$

$$\Rightarrow x = 231 \text{ km.}$$

Q. The speed of two trains are in the ratio 5 : 3. They are going in opposite directions along parallel tracks. If the first train crosses a pole in 4 seconds and the second in 8 seconds, how long will they take to cross each other?

Solution:

Time taken = $(ax + by) / (x + y)$, Here, x = 5, y = 3, a = 4, b = 8.

$$T = (20 + 24) / 8 = 5.5 \text{ seconds.}$$

Q. A monkey tries to ascend a pole, 21 m in length. He ascend 3 meters in first minute and slips down 2 meter in alternative minute. If he continues to ascend in this fashion, how long will he take to reach the top?

Solution:

In 2 minutes he travels $(3 - 2) = 1 \text{ m}$

For 18 metres he takes 36 minutes.

In 37th minutes he reach $18 + 3 = 21 \text{ m}$

As after reaching the top he doesn't slip

Q. A thief is spotted by a policemen from a distance of 65 metres. When police starts the chase, the thief also starts running. If the speed of thief is 10 m/sec and speed of policemen is 12.5 m/sec, how far will have the thief run before he is overtaken?

Solution:

The distance covered by thief = $(\text{Lead distance} / \text{Relative speed}) \times \text{Speed of thief}$

$$\Rightarrow 65 / (12.5 - 10) \times 10 = 260 \text{ m.}$$

Q. Wages for 54 women amount to Rs.12000 in 36 days. How many men must work 12 days to receive Rs.4000 if the daily wages of a man being 3 times those of a woman?

Solution:

Wage for a woman = $12000/(54*36) = 500/81$

Wage for a man = $3 * 500/81 = 500/27$

number of men = $\text{Total wage}/(\text{Number of days} * 1 \text{ man's } 1 \text{ day's wage}) = 4000*27 / 500*12 = 18.$

Q. From a pack of 52 cards, 2 cards are drawn randomly. What is the probability that it has exactly one king?

Solution:

Total number of king = 4

Selecting '1' king out of 4 in ${}^4C_1 = 4$ ways

Now remaining 1 cards has to be selected from $52 - 4 = 48$ cars in ${}^{48}C_1 = 48$ ways

$n(E) = 4*48$

$n(S) = {}^{52}C_2 = 26*51$

$P(E) = 4*48/26*51 = 32/221$

Q. In how many ways 20 different things can be divided equally among 5 persons?

Solution:

Each person gets 4 things. Now first person can be given 4 things out of 20 different things in ${}^{20}C_4$ ways.

Now second person is given 4 things out of 16 different things in ${}^{16}C_4$ ways.

In same ways the total number of ways is: ${}^{20}C_4 * {}^{16}C_4 * {}^{12}C_4 * {}^8C_4 * {}^4C_4$

Total number of ways = $20!/(4!)^5$

Q. The difference between the amount of compound interest and simple interest accrued on an amount of Rs. 26000 at the end of 3 years is Rs. 2994.134. What is the rate of interest p.c. p.a.?

Solution:

$$\text{Principal} = \frac{\text{Difference} \times 100^3}{r^2(r + 300)} \Rightarrow 26000 = \frac{2994.134 \times 100^3}{r^2(r + 300)} \Rightarrow r^2(r + 300) = 1151159$$

By solving the above equation we can get $r = 19\%$ per annum

Q. What approximate amount of compound interest can be obtained on an amount of Rs 4840 at the rate of 8% p.a at the end of 3 years?

Solution:

$$CI = 4840(1-(1+8/100)^3) = 1257$$

Q. The difference between a two-digit number and the number obtained by interchanging the digits of the two-digit number is 45. If the average of the digits of the two-digit number is 4.5 then what is 275% of the two-digit number?

Solution:

Let the number be $10x+y$

So, $(10x+y) - (10y+x) = 45$

$$x-y = 5$$

And $x+y = 4.5 \times 2 = 9$

Solving both equations we get,

$$x = 7, y = 2$$

Required number = 72

$$275\% \text{ of } 72 = 198$$

Q. The ratio of present ages of two persons A and B is 5 : 9 respectively. Eight years ago the ratio of their ages as 1 : 2. What would be the respective ratio of their ages after eight years?

Solution:

$$(5x-8)/(9x-8)=1/2$$

$$x = 8$$

$$\text{Required ratio} = (5x+8)/(9x+8)=6/10=3:5$$

Q. The monthly rent of a shop of dimension 18 feet \times 22 feet is Rs. 2244. What is the annual rent per square foot of the shop?

Solution:

$$\text{Monthly rent per square feet} = 2244/(18 \times 22)$$

& Annual rent per square feet

$$= 12 \times (2244/(18 \times 22)) = 68$$

Q. The width of a rectangle is 10 meter and its area is 150 square meter. If length of the rectangle is increased, then its new area is $1\frac{1}{3}$ times of the original area. What is the new perimeter of the rectangle?

Solution:

$$\text{Length of original rectangle} = 150/10 = 15$$

$$(10 \times (15+x))/(10 \times 15) = 4/3$$

$$x = 5$$

$$\text{Perimeter of new rectangle} = 2(10+20) = 60$$

Q. The length of a rectangle is double its width. If the length is diminished by 5 cm and the width is increased by 5 cm then its area is increased by 75 cm square. What is the length of the rectangle?

Solution:

According to question

$$(l-5)(b+5)-lb = 75$$

$$\text{And } l = 2b$$

$$\text{So, } b = 20, l = 40$$

Q. If each of the opposite sides of a square is increased by 8 cm then ratio of sides of the rectangle thus formed is 5 : 3. What is the area of the original square?

Solution:

$$(x+8)/x = 5/3$$

$$x = 12$$

$$\text{Required area} = 12 * 12 = 144$$

Q. The length of a rectangular plot is 10 meter more than its width. The cost of fencing the plot along its perimeter at the rate of Rs. 6.5 meter is Rs. 1690. The perimeter of the plot is.

Solution:

$$\text{Let width} = x, \text{ Length} = (10+x)$$

$$\text{Perimeter} = 2(x+(10+x))$$

$$= 2(2x+10)$$

$$\& 2(2x+10) * 6.5 = 1650$$

$$x = 60$$

$$\text{Required perimeter} = 2(60+70) = 260$$

Q. The length of a rectangular hall is 5 meter more than its width. The area of the hall is 750 m² then what is the length of the hall?

Solution:

$$x(x+5) = 750$$

$$x = 25$$

$$\text{Length} = 25+5 = 30$$

Q. The width of a rectangular hall is three fourth of its length. If Area of the floor is 768 m² then what is the difference between length and width of the hall?

Solution:

length = l, width = $\frac{3}{4}l$

$$L * \frac{3}{4}l = 768$$

$$L = 32$$

$$B = 24$$

$$\text{Required answer} = 32 - 24 = 8$$

Q. The length of a rectangular plot is 5 folds its width. Half the area of the plot is covered by a playground whose area is 245 square meter. What is the length of the plot?

Solution:

Let width = x, length = 5x

$$x * 5x = 245 * 2$$

$$x = 7\sqrt{2}$$

$$\text{Length} = 5 * 7\sqrt{2} = 35\sqrt{2}$$

Q. The length of a rectangular landscape is 4 times its breadth. There is a playground in it whose area is 1200 square meter and which is one third of the total landscape. What is the length of the landscape?

Solution:

$$x * 4x = 3 * 1200$$

$$x = 30$$

$$\text{Length} = 4 * 30 = 120$$

Q. The length of a rectangle is reduced by 20%. By what percent would the width have to be increased to maintain the original area?

Solution:

$$\text{Required change} = \frac{(20 * 100)}{(100 - 20)} = 25\%$$

Q. The average weight of three men J, K and L is 75 kg. Another man M joins the group and the average now becomes 78 kg. If another man N whose weight is 5 kg less than that of M, replace J then the average weight of K, L, M and N becomes 77 kg. Find the weight of J.

Solution:

$$\text{Total weight of J, K and L} = 75 * 3 = 225 \text{ kg}$$

$$\text{Total weight of J, K, L and M} = 78 * 4 = 312 \text{ kg}$$

$$\text{Weight of M} = 312 - 225 = 87 \text{ kg}$$

$$\text{Weight of N} = 87 - 5 = 82 \text{ kg}$$

$$\text{Total weight of K, L, M \& N} = 77 * 4 = 308 \text{ kg}$$

Total weight of K, L & M = $308 - 82 = 226$ kg

Weight of J = weight of (J, K, L and M) – weight of (K,

L and M)

= $312 - 226 = 86$ kg

Q. In how many ways a committee of 6 members can be selected from 6 men and 5 women, consisting of 4 men and 2 women?

Solution:

Required number of ways = ${}^6C_4 \times {}^5C_2 = 6 \times 5/2 * 5 \times 4/2 = 150$

Q. There are 50 buckets and 50 persons. Person 1 keeps one ball in every bucket, person 2 keeps two balls in every 2nd bucket, person three keeps 3 balls in every third bucket. This process goes on till 50th person keeps 50 balls in 50th bucket. Find the total number of balls kept in 50th bucket.

Solution:

1st person, 2nd person, 5th person, 10th person, 25th

person & 50th person will put balls in the 50th bucket.

So number of balls in the 50th bucket = $1 + 2 + 5 + 10 + 25 + 50 = 93$

Q. Ten years ago the average age of a family of four members was 28 years. Two children have been born, the present average age of family is same. What are the present ages of the children if the age difference between both the children is 2 years?

Solution:

Ten years ago, total age of four members = $28 \times 4 = 112$ years

Total age of four members at present = $(28 + 10) \times 4 = 152$ years

And present age of four members + two children = $28 \times 6 = 168$ years

So age of the two children = $168 - 152 = 16$

So age of 1st child = 9 years

And age of 2nd child = 7 years

Q. In an examination, every candidate took German or English or both subjects as a language paper. 76.5% of the candidates took German and 48.7% took English. If the total number of candidates appeared in the examination is 3250, then how many candidates took both the subjects?

Solution:

Let total number of candidates be = 100

Number of candidates who took both German and English = $(76.5 + 48.7) - 100 = 25.2$

i.e. 100 units ---> 3250

25.2 units $\rightarrow 3250/100 * 25.2 = 819$

Q. Twenty-four men can complete a work in 18 days and twenty women can complete the same work in 16 days. Thirty-six men started the work and left after 3 days. Now ten women started the work and left after 4 days. What amount of left is completed by now?

Solution:

24m in 18 days, so 36 in $24*18/36 = 12$ days

In 3 days, they did $1/12 * 3 = 1/4$ work

20w in 16 days, so 10 in $20*16/10 = 32$ days

In 4 days, they did $1/32 * 4 = 1/8$ work

So completed work = $1/4 + 1/8$

Q. A box contains 320 tickets (numbered 1 to 320). Find the probability of drawing a ticket containing a multiple of 3 or 8.

Solution:

Multiple of 3 up to 320 = $320/3 = 106$

Multiple of 8 up to 320 = $320/8 = 40$

Multiples of $3*8 = 24$ up to 320 = $320/24 = 13$

So required probability = $(106+40 - 13)/320$

Q. A sum of Rs 6600 is invested in parts in two schemes offering 8% and 12% per annum rate of interest respectively. If these parts are invested for 3 years and after 3 years the interest on first part is one-third the interest on second part, then find the part invested in scheme offering 12% per annum rate of interest.

Solution:

$$(6600-x)*8*3/100 = 1/3 * (x*12*3/100)$$

Solve, $x = 4400$

Q. An article is marked 30% above the cost price and it gets a 10% discount also. Find the profit percent if the seller cheats while selling by using 20% less weight.

Solutions:

Let CP = 100

So MP = 130

So SP after discount = $90/100 * 130 = 117$

Now seller selling 20% less in weight so CP = Rs 80

Now CP = 80, SP = 117

So profit % = $37/80 * 100$

Q. A and B started a business with investments Rs 1750 and Rs 2100 respectively. After 5 months, B left and C and D joined with investments as Rs 4000 and Rs 6500 respectively. If difference in total shares of C and D together and total shares of A and B together is Rs 6,720, find the annual profit.

Solution:

A : B : C : D

$1750 \times 12 : 2100 \times 5 : 4000 \times 7 : 6500 \times 7$

$25 \times 12 : 30 \times 5 : 400 : 650$

$12 : 6 : 16 : 26$

$6 : 3 : 8 : 13$

$[(8+13)-(6+3)] / (6+3+8+13) \times x = 6720$

Solve, $x = 16,800$

Q. 20 tailors stitch 20 shirts in 4 days taking 6 hours each day. 10 tailors will stitch how many shirts in 9 days working 4 hours each day?

Solutions:

$M_1 \times D_1 \times T_1 \times W_2 = M_2 \times D_2 \times T_2 \times W_1$

$20 \times 4 \times 6 \times x = 10 \times 9 \times 4 \times 20$

Solve, $x = 15$

Q. 3 friends started a business. Arun invested Rs 3600, Bhuvan Rs 4200 and Sahil Rs 3900. After 8 months from the start of business, Arun took back Rs 300, Bhuvan and Sahil both added Rs 300 each. What will be the ratio of share of their profits at the end of a year?

Solution:

$3600 \times 8 + 3300 \times 4 : 4200 \times 8 + 4500 \times 4 : 3900 \times 8 + 4200 \times 4$

$36 \times 2 + 33 : 42 \times 2 + 45 : 39 \times 2 + 42$

$12 \times 2 + 11 : 14 \times 2 + 15 : 13 \times 2 + 14$

$35 : 43 : 40$

Q. There are 3 red, 4 white and 5 green balls in an urn. 2 balls are chosen at random. What is the probability that the second ball is green?

Solution:

Second ball is green means first ball can be any of the three colors.

We will have to take cases, because if first ball is green, then second green will have to be chosen from $(5-1) = 4$ green balls and not 5.

Case 1: 1st ball is red or white and 2nd is green

$$7/12 * 5/11 = 35/132$$

Case 2: 1st ball is green and 2nd is green

$$5/12 * 4/11 = 20/132$$

Add both cases:

$$55/132 = 5/12$$

Q. In a 55 litres solution, milk and water are present in the ratio 3 : 2. How much milk or water (in litres) will have to be added in order to make milk as 80% in the solution?

Solution:

Milk is $3/(3+2) * 100 = 60\%$, so water is 40%

This means to make milk as 80% and water 20%, milk will have to be added. Let x l of milk to be added

Milk in 55 l was $3/5 * 55 = 33$ l

So in final mixture after adding x litres milk, milk will be (33+x) l and total solution (55+x),

$$\text{So } (33+x)/(55+x) * 100 = 80$$

Solve, x = 55 l

Q. First train starts at 6 PM with 60 km/hr from point A. After 1 n half hour, second train starts from opposite direction with respect to first train from point B and approaches first train with 75 km/hr. If the distance between both points A and B is 1080 km, at what time will the trains meet?

Solution:

Let after x hours from point A they meet, that means that after (x+1.5) hrs from point B they will meet.

$$\text{So } 60 * x + 75 (x+1.5) = 1080$$

Solve, x = 8 hrs 50 minutes

Q. The speed of boat is 9 km/hr and speed of stream is 5 km/hr. A person goes 112 km downstream from point A to B and same distance upstream from point B to C. In how much total time will he cover his journey?

Solution:

Downstream speed = $9+5 = 14$

Upstream speed = $9-5 = 4$

$$\text{So time} = (112/14) + (112/4) = 8+28$$

Q. The sum of money invested at compound interest amounts to Rs 6840 in 2 years and to Rs 8208 in 3 years. What was the amount of sum invested?

Solution:

$$\text{SI on } 6840 \text{ for } 1 \text{ yr} = 8208 - 6840 = 1368$$

$$\text{So rate} = (100 \times 1368 / 6840 \times 1) = 20$$

$$\text{So } P(1 + 20/100)^2 = 6840$$

$$\text{Solve, } P = 4750$$

Q. The rectangle whose sides are 8 cm and 6cm has perimeter equal to half of the perimeter of a square. If the diameter of a circle is equal to the side of the square, find the circumference of the semicircle?

Solution:

$$\text{Perimeter of square} = 2 * \text{peri. of rect} = 2 * 2(8+6) = 56$$

$$\text{So side of square} = 56/4 = 14$$

$$\text{So diameter of circle} = 14, \text{ radius} = 14/2 = 7$$

$$\text{So circumference of circle} = \pi r + d = (22/7)*7 + 14$$

Q. The train goes from station A to B and back to station A in 17 hours where total distance covered by train is 1800 km. The train halted for two hours after reaching station B. If the average speed of train from A to B is 20% more than that from B to A, what is the speed of train from A to B station?

Solution:

$$\text{Let speed in return journey is } x, \text{ then in A to B is } (120/100)*x = 6x/5$$

$$\text{So } 900/x + 900/(6x/5) = 15$$

$$\text{Solve, } x = 110$$

$$\text{So from A to B is } 6*110/5$$

Q. The number of students in school A is 5,500 and that in school B is 8,000. The ratio of boys in schools A and B is 2 : 3 respectively. If the number of girls in school B is 2000, find the number of girls in school A.

Solution:

$$\text{Boys in school B} = 8000 - 2000 = 6000$$

$$\text{So } x/6000 = 2/3$$

$$\text{Solve, } x = 4000$$

$$\text{So girls in school A} = 5500 - 4000 = 1500$$

Q. Difference between compound interest and simple is 930 at 10% per annum for 3 years. Find the sum?

Solution:

$$\text{Difference} = P * [(300+R)*R^2] / [100]^3$$

$$\implies 930 = P * [(300+10)*10^2] / [100]^3$$

$$\implies P = 30,000$$

Q. P invested 5000 in for 1 year and Q joined later with 20000. If at the end of year both received equal share of profit. Find how many months Q invested?

Solution:

$$\Rightarrow [5000 \times 12] / [20000 \times X] = 1/1$$

$$\Rightarrow X = 3 \text{ months}$$

Q. Present Average age of son and father is 34. Ratio of son and mother age is 5:9. If mother age is 36 years, Find the age of father after 13 years?

Solution:

$$36 \text{ ----- } 9$$

$$X \text{ ----- } 5$$

$$\text{Son age (X)} = 20$$

$$\text{Father age} = 34 \times 2 - 20 = 48$$

$$\text{Father age after 13 years} = 48 + 13 = 61 \text{ years}$$

Q. If the ages of Mohan and Rohan are added to twice the age of Shyam, the total becomes 59; if the ages of Shyam and Rohan are added to thrice age of Mohan, then the total becomes 68 and if the age of Mohan is added to thrice the age of Shyam and thrice the age of Rohan, then the total becomes 108. What is the age of Mohan?

Solution:

According to question,

$$\text{Mohan} + \text{Rohan} + 2\text{Shyam} = 59 \text{(i)}$$

$$\text{Shyam} + \text{Rohan} + 3\text{Mohan} = 68 \text{ (ii)}$$

$$\text{Mohan} + 3\text{Shyam} + 3\text{Rohan} = 108 \text{ ...(iii)}$$

Subtract equation (iii) from thrice the equation (ii), we get

$$3\text{Shyam} + 3\text{Rohan} + 9\text{Mohan} - \text{Mohan} - 3\text{Shyam} - 3\text{Rohan} = 204 - 108$$

$$\Rightarrow 8 \text{ mohan} = 96 \Rightarrow \text{Mohan} = 12 \text{ years}$$

Q. Ravi borrowed a certain sum from Anil at a certain rate of simple interest for 2 years. He lent this sum to Sumit at the same rate of interest compounded annually for the same period. At the end of two years, he received Rs.4200 as compound interest but paid Rs.4000 only as simple interest. Find the rate of interest.

Solution:

Let the money borrowed be Rs.x and the rate be r% and time = 2 years

$$\text{Therefore, } 4000 = \frac{x \times r \times 2}{100} \Rightarrow rx = 200000$$

$$\text{and } x \left[1 + \left(\frac{r}{100} \right) \right]^2 = x + 4200$$

$$\Rightarrow x + \frac{xr^2}{100000} + \frac{2xr}{100} = 4200 + x$$

$$\Rightarrow 20r + 4000 = 4200 \Rightarrow r = 10\%$$

Q. Sonu invested an amount of Rs.60,000 to start a software business. After six months, Monu joined with an amount of Rs.90,000. After one year from the commencement of the business, Sonu put in an additional amount of Rs.20,000. At the end of three years, they earned a profit of Rs.71,20,000. What is Sonu's share in the profit?

Solution:

Equivalent capital of Sonu for 3 year = $(60,000 \times 1 + 80,000 \times 2) = (60,000 + 1,60,000) = \text{Rs.}2,20,000$

Equivalent capital of Monu for 3 year = $(90,000 \times 2 \frac{1}{2}) = 2,25,000$

Ratio of their capitals = $220000 : 225000 = 44 : 45$

Sum of ratios = $44 + 45 = 89$

Total profit = $\text{Rs.}71,20,000$

Therefore, Sonu's share = $\frac{44}{89} \times 71,20,000 = \text{Rs.} 35,20,000$

Q. Salma invests 7% i.e. Rs.2170 of her monthly salary in mutual funds. Later she invests 18% of her monthly salary in recurring deposits also and she invests 6% of her monthly salary on NSCs. What is the total annual amount invested by Salma?

Solution:

Salma's monthly salary = $\frac{2170 \times 100}{7} = \text{Rs.} 31000$

Percentage monthly investment by Sujata = $7 + 18 + 6 = 31\%$

Salma's annual investment = $12 \times \frac{31}{100} \times 31000 = \text{Rs.} 1,15,320$

Q. On a shelf there are 4 books of Economics, 3 books of Management and 4 books of Statistics. In how many different ways can the books be arranged so that the books of Economics are kept together?

Solution:

Books on Economics are to be kept together. Hence, we are to arrange 3 books on management, 4 books on Statistics and one book on Economics. These can be arranged in $8!$ ways.

Again, 4 books on Economics can be arranged together in $4!$ ways.

Therefore, Total number of arrangements = $8! \times 4! = 967680$

Q. If the manufacturer gains 10%, the Wholesale dealer 15% and the retailer 25%, then what is the cost of production of an article whose retail price is Rs.1265?

Solution:

C.P of an article = $1265 \times \frac{100}{110} \times \frac{100}{115} \times \frac{100}{125} = \text{Rs.} 800$

Q. Railway fares of 1st, 2nd and 3rd classes between two stations are in the ratio of 8 : 6 : 3. The fares of 1st and 2nd class were subsequently reduced by $\frac{1}{6}$ and $\frac{1}{12}$ respectively. If during a year, the ratio between the number of passengers of 1st, 2nd and 3rd classes was 9 : 12 : 26 and total amount collected by the sale of tickets was Rs.1088, then find the collection from the passengers of 1st class.

Solution:

$$\text{New ratio of fares} = 8 \times \frac{5}{6} : 6 \times \frac{11}{12} : 3 \times 1 = 80 : 66 : 36 = 40 : 33 : 18$$

$$\text{Ratio of passengers} = 9 : 12 : 26$$

$$\Rightarrow \text{Ratio of amount collected} = 40 \times 9 : 12 \times 33 : 26 \times 18 = 90 : 99 : 117$$

$$\text{Amount collected from 1st class fares} = \frac{99}{306} \times 1088 = \text{Rs. } 320$$

Q. A man is sitting in a train notices that he can count 21 telephone posts in one minute. If they are apart from each other is 50 m then at what speed is the train travelling?

Solution:

$$\text{Since, Distance between 21 posts} = (21 - 1) \times 50 = 1000 \text{ m}$$

$$\text{Therefore, Speed of train} = 1 \text{ km/min} = 60 \text{ km/h}$$

Q. 4 men and 10 women were put on a work. They completed $\frac{1}{3}$ of the work in 4 days. After this 2 men and 2 women were increased. They completed $\frac{2}{9}$ more of the work in 2 days. If the remaining work is to be completed in 3 days, then how many more women must be increased?

Solution:

Let one man takes x days to complete the work and one woman takes y days to complete the work independently

Then,

$$\frac{4 \times 4}{x} + \frac{10 \times 4}{y} = \frac{1}{3} \text{ --- --- --- } (i)$$

$$\text{and } \frac{6 \times 2}{x} + \frac{12 \times 2}{y} = \frac{2}{9} \text{ --- --- --- } (ii)$$

Solving above equations, we get $x = 108$, $y = 216$

Let z women be added to complete the work in 3 days. Then

$$\frac{6 \times 3}{108} + \frac{3(12 + z)}{216} = 1 - \left(\frac{1}{3} + \frac{2}{9} \right) = \frac{4}{9}$$

$$\Rightarrow 36 + 36 + 3z = \frac{216 + 4}{9} = 96 \Rightarrow 3z = 96 - 72 \Rightarrow z = 8$$

Q. Rita's present age is four times her daughter's present age and $\frac{2}{3}$ of her mother's present age. The total of the present ages of all of them is 154 years. What is the difference between Rita's and her mother's present age?

Solution:

Let Rita's present age be x years.

Her daughter's age = $x/4$ years.

Her mother's age = $3x/2$ years.

Now, total sum of ages of Rita, her daughter and her mother = 154

$$\Rightarrow \frac{x}{4} + \frac{3x}{2} = 154 \Rightarrow x = 56 \text{ years}$$

Therefore, Rita's mother's age = 84

Therefore, Difference = $84 - 56 = 18$ years

Q. The ratio between the three angles of a quadrilateral is 3 : 5 : 9. The value of the fourth angle of the quadrilateral is 710. What is the difference between the largest and the smallest angles of the quadrilateral?

Solution:

Let the quadrilateral angles be $3x$, $5x$, $9x$ and 710.

Total sum of angles = $3x + 5x + 9x + 710 = 3600$

$$\Rightarrow 17x = 3600 - 710 = 2890 \Rightarrow x = 170$$

Hence, angles are 510, 850, and 710.

$$\Rightarrow \text{Difference} = 850 - 510 = 340$$

Q. The ratio between the speed of a truck, car and train is 3 : 8 : 12. The car moved uniformly and covered a distance of 1040 km in 13 hours. What is the average speed of the truck and the train together?

Solution:

Speed of car = $1040/13 = 80$ kmph

Ratio of speed of truck, car and train = 3 : 8 : 12

$$\text{Now, } 8x = 80 \Rightarrow x = 10$$

Hence, truck = 30 kmph

Train = 90 kmph

$$\text{Therefore, Average speed of truck and train together} = \frac{30 + 90}{2} = \frac{120}{2} = 60 \text{ kmph}$$

Q. The second largest and the smallest angles of a triangle are in the ratio of 6 : 5. The difference between the second largest angle and the smallest angle of the triangle is equal to 90. What is the difference between the smallest and the largest angles of the triangle?

Solution:

Let the second largest angle of the triangle be $6x$ and the smallest angle $5x$.

$$\text{Now, } 6x - 5x = 90 \Rightarrow x = 90$$

Second largest angle = 540°

Smallest angle = 45°

Sum of angles of a triangle = 180°

Therefore, largest angle = $180 - 99 = 81^\circ$

Therefore, Difference = $81 - 45 = 36^\circ$

Q. The circumference of a circle is twice the perimeter of a rectangle. The area of the circle is 5544 sq cm. What is the area of the rectangle if the length of the rectangle is 40 cm?

Solution:

Area of circle = $A = \pi r^2 = 5544$

$$r^2 = \frac{5544 \times 7}{22} = 1764 \Rightarrow r = 42$$

Circumference of circle = $2 \times$ perimeter of rectangle

Or $2 \times 22/7 \times 42 = 2 \times$ perimeter of rectangle

Or Perimeter of rectangle = 132 cm

Or $2(l + b) = 132 \Rightarrow (l + b) = 66 \Rightarrow b = 66 - 40 = 26$

Area of rectangle = $40 \times 26 = 1040\text{cm}^2 = 1040$ sq cm.

Q. A 476-metre-long moving train crosses a pole in 14 seconds. The length of a platform is equal to the distance covered by the train in 20 seconds. A man crosses the same platform in 7 minutes and 5 seconds. What is the speed of the man in metre/second?

Solution:

Speed of train = $476/14 \times 34$ m/s

Length of platform = $34 \times 20 = 680$ metre

(Since, 7 minute 5 second = $7 \times 60 + 5 = 425$ second)

Speed of man = $680/425 = 1.6$ m/s

Q. 2/3 of Ranjit's monthly salary is equal to Raman's monthly salary. Raman's monthly salary is 30% more than Pawan's monthly salary. Pawan's monthly salary is Rs.32000. What is Ranjit's monthly salary?

Solution:

Pawan's monthly salary = Rs.32000

Raman's monthly salary = $\text{Rs.}32000 \times 130/100 = \text{Rs.}41600$

Ranjit's monthly salary = $3/2 \times 41600 = \text{Rs.}62400$

Q. The simple interest accrued on a sum of a certain principal is Rs.35672.7 in 7 years at the rate of 8 pcpa. What would be the compound interest accrued on that principal at the rate of 2 pcpa in 2 years?

Solution:

$$\text{Principal} = \frac{35672.7 \times 100}{7 \times 8} = 63700$$

$$2 + 2 + \frac{2 \times 2}{100} = 4.04$$

$$\Rightarrow CI = \frac{4.04 \times 63700}{100} = \text{Rs. } 2573.48$$

Q. In a class there are 60 students, out of whom 15% are girls. Each girl's monthly fee is Rs.250 and each boy's monthly fee is 34% more than a girl. What is the total monthly fees of girls and boys together?

Solution:

$$\text{Number of girls} = 60 \times \frac{15}{100} = 9$$

$$\text{Total monthly fee of girls} = 250 \times 9 = \text{Rs. } 2250$$

$$\text{Number of boys} = 60 - 9 = 51$$

$$\text{Monthly fee of one boy} = 250 \times \frac{134}{100} = \text{Rs. } 335$$

$$\text{Total monthly fee of boys} = 51 \times 335 = \text{Rs. } 17085$$

$$\text{Therefore, Sum} = 17085 + 2250 = \text{Rs. } 19335$$

Q. A container has 30 litres of water. If 3 litres of water is replaced by 3 litres of spirit and this operation is repeated twice, then what will be the quantity of water in the new mixture?

Solution:

Suppose a container contains x units of liquid from which y units are taken out and replaced by water. After n operations, the quantity of pure liquid = $x \left(1 - \frac{y}{x}\right)^n = 30 \left(1 - \frac{3}{30}\right)^2 = \frac{30 \times 9 \times 9}{100} = 24.3 \text{ liters}$

Q. Some students planned a picnic. The budget for food was Rs.500. But 5 of them failed to go and thus the cost of food for each member increased by Rs.5. How many students attend the picnic?

Solution:

Let there were x students, then contribution of one student = $500/x$

Contribution of each students where 5 of them have left = $\frac{500}{x-5}$

$$\text{Given, } \frac{500}{x-5} - \frac{500}{x} = 5$$

using options, we find $x = 25$ satisfies the equation. Therefore, number of students who attended the picnic = $(25 - 5) = 20$.

Q. The product of two 2-digit numbers is 2028 and their HCF is 13. The sum of the numbers is :

Solution:

Let the number be $13x$ and $13y$ where x and y are prime to each other.

Therefore, $13x \times 13y = 2028 \Rightarrow xy = 12 = 3 \times 4$

Therefore Numbers = $13 \times 3 = 39$ and $13 \times 4 = 52$

Therefore Sum of Numbers = $39 + 52 = 91$

Q. Surface area of a cuboid is 22 cm² and the sum of the lengths of all its edges is 24 cm. Length of each diagonal of the cuboid (in cm) is :

Solution:

Let the length, breadth and height of the cuboid be a , b and c cm respectively.

$2(ab + bc + ca) = 22$ and, $4(a + b + c) = 24$

$\Rightarrow a + b + c = 6 \Rightarrow (a + b + c)^2 = a^2 + b^2 + c^2 + 2ab + 2ac + 2bc \Rightarrow 36 = a^2 + b^2 + c^2 + 22 \Rightarrow a^2 + b^2 + c^2 = 14 \Rightarrow \sqrt{(a^2 + b^2 + c^2)} = \sqrt{14}$ = diagonal of cuboid

Q. A number when divided by 765 leaves a remainder 42. What will be the remainder if the number is divided by 17?

Solution:

Let the number be $(765x + 42)$.

When this number is divided by 17, then quotient will be $(45x + 2)$ and remainder will be 8.

Q. A, B and C started a business with their investment in the ratio 1 : 3 : 5. After 4 months, A invested the same amount as before and B as well as C withdrew half of their investments. The ratio of their profits at the end of the year will be:

Solution:

Let their initial investments be Rs. x , Rs. $3x$ and Rs. $5x$ respectively.

Then, $A : B : C = (x \times 4 + 2x \times 8) : \left(3x \times 4 + \frac{3x}{2} \times 8\right) : \left(5x \times 4 + \frac{5x}{2} \times 8\right) = (4x + 16x) : (12x + 12x) : (20x + 20x) = 20x : 24x : 40x = 5 : 6 : 10$

Q. Fresh grapes contain 80% water while dry grapes contain 10% water. If the weight of dry grapes is 250 kg, then what was its total weight when it was fresh?

Solution:

	Water	Pulp
Fresh Grapes	$4x$	x

Dry Grapes Y 9y

Pulp in dry grapes = $250 \times 90/100 = 225$ kg

Therefore $x = 9y = 225$ kg

Therefore Weight of fresh grapes = $5x = 5 \times 225 = 1225$ kg

Q. Two men and 7 children complete a certain piece of work in 4 days while 4 men and 4 children complete the same work in only 3 days. The number of days required by 1 man to complete the work is:

Solution:

According to the question, $(2M + 7C)$'s 1 day work = $\frac{1}{4}$

It means that 1 work will be finished by $(8M + 28C)$

Again $(4M + 4C)$'s 1 days work = $\frac{1}{3}$ or 1 work will be completed by $12M + 12C$

Therefore $8M + 28C = 12M + 12C \Rightarrow M = 4C$

Therefore $4M + 4C = 5M$

Since, 5 M complete a work in 3 days. Then, 1 M will complete it in 15 days.

Q. In a certain store, the profit is 320% of the cost. If the cost increase by 25% but the selling price remains Constant, approximately what percentage of the selling price is the profit?

Solution:

Let the original cost price be Rs.100.

Then, profit = Rs.320 and SP = Rs.420

New CP = Rs.125 \Rightarrow New profit = Rs.295

Required percentage = $295/420 \times 100 = 70.23\%$

Q. The distance between two cities A and B is 330km. A train starts from A at 8 (a)m. and travels towards B at 60 km/hr. Another train starts from B at 9 (a)m. and travels towards A at 75 km/hr. At what time do they meet?

Solution:

Distance travelled by first train in one hour = $60 \times 1 = 60$ km

Therefore, distance between two train at 9 a.m. = $330 - 60 = 270$ km

Now, Relative speed of two trains = $60 + 75 = 135$ km/hr

Time of meeting of two trains = $270/135=2$ hrs.

Therefore, both the trains will meet at $9 + 2 = 11$ A.M.

Q. Buses start from a bus terminal with a speed of 20 km/hr at intervals of 10 minutes. What is the speed of a man coming from the opposite direction towards the bus terminal if he meets the buses at intervals of 8 minutes?

Solution:

Distance covered in 10 minutes at 20 kmph = distance covered in 8 minutes at (20+x) kmph

$$20 \times 10/60 = 8/60(20+x) \Rightarrow 200 = 160 + 8x \Rightarrow 8x = 40$$

Therefore, $x = 40/8 = 5$ kmph

Q. In covering a distance of 30 km, Abhay takes 2 hours more than Sameer. If Abhay doubles his speed, then he would take 1 hour less than Sameer. Abhay's speed is?

Solution:

Let Abhay's speed be x km/hr.

$$\text{Then, } 30/x - 30/2x = 3$$

$$6x = 30$$

$$x = 5 \text{ km/hr}$$

Q. It takes eight hours for a 600 km journey, if 120 km is done by train and the rest by car. It takes 20 minutes more, if 200 km is done by train and the rest by car. The ratio of the speed of the train to that of the cars is?

Solution:

Let the speed of the train be x km/hr and that of the car be y km/hr.

$$\text{Then, } 120/x + 480/y = 8 \quad 1/x + 4/y = 1/15 \dots(i)$$

$$\text{And, } 200/x + 400/y = 25/3 \quad 1/x + 2/y = 1/24 \dots(ii)$$

Solving (i) and (ii), we get: $x = 60$ and $y = 80$.

$$\text{Ratio of speeds} = 60 : 80 = 3 : 4$$

Q. If a train runs at 40 km/hour, it reaches its destination late by 11 minutes. But if it runs at 50 km/hour, it is late by 5 minutes only. The correct time (in minutes) for the train to complete the journey is?

Solution:

If the distance be x km, then $x/40 - x/50 = 6/60 \Rightarrow x/4 - x/5 = 1 \Rightarrow x = 20$ km.

$$\text{Required time} = (20/40) \text{ hour} - 11 \text{ minutes} = (1/2 \times 60 - 11) \text{ minutes} = 19 \text{ minutes}$$

Q. The average temperature of Monday, Tuesday, Wednesday and Thursday was 38° and that of Tuesday, Wednesday, Thursday and Friday was 40° . If the temperature on Monday was 30° , the temperature of Friday was:

Solution:

$$M+T+W+Th=(4 \times 38)=152$$

Monday temperature is 30. So $T+W+Th=(152-30)=122$

$$T+W+Th+F=(4 \times 40)=160$$

$$F = (160-122)= 38$$

Q. The average of weight of three men A,B and C is 84 kg. Another man D joins the group and the average now becomes 80 kg. If another man E, whose weight is 3 kg.more than that of D, replaces A, then the average weight of B,C,D and E becomes 79 kg. The weight of A is :

Solution:

$$A+B+C = 3 \times 84=252$$

$$A+B+C+D= (4 \times 80)=320$$

$$D = (320-252)=68 \text{ and } E = (68+3)=71$$

$$\text{Now, } B+C+D+E = (4 \times 79)=316$$

$$B+C+D=(316-71)=245 \text{ kg}$$

$$\text{So, } A = (320-245)=75 \text{ kg}$$

Q. The average age of 30 students in a class is 12 years. The average age of a group of 5 of the students is 10 years and that of another group of 5 of them is 14 years. The average of the remaining students is

Solution:

$$\text{Let it be } x . \text{ Then : } 5 \times 10 + 5 \times 14 + 20 \times x = 30 \times 12$$

$$\Rightarrow 20x = 360 - 120 \text{ or } 20x = 240 \text{ or } x = 12$$

Q. A train overtakes two persons who are walking in the same direction in which the train is going, at the rate of 2 kmph and 4 kmph and passes them completely in 9 and 10 seconds respectively. The length of the train is

Solution:

Let the length of the train be x meters and its speed is y m/sec

$$\text{Then } \left(\frac{x}{y-\frac{5}{9}} \right) = 9 \text{ and } \left(\frac{x}{y-\frac{10}{9}} \right) = 10$$

Therefore, on solving the above equations $x = 50$

Therefore, Length of the train is 50m

Q. A train travelling at 36 kmph completely crosses another train having half its length and travelling in the opposite direction at 54 kmph, in 12 seconds. If it also passes a railway platform in 112 minutes, the length of the platform is:

Solution:

Let the length of slower train be x metres and the length of faster train be $(x/2)$ meters.

Relative speed = $(36+54)$ km/hr $= (90 \times 5/18)$ m/sec = 25 m/sec

$3x/(2 \times 25) = 12 \Rightarrow 3x = 600 \Rightarrow x = 200$ m

Length of slower train = 200 m

Let the length of platform be y metres

Then, $(200+y)/(36 \times 5/18) = 90 \Rightarrow 200+y = 900$ or

$y = 700$ m Length of platform = 700 m

Q. Sanjay borrowed a certain sum from Anil at a certain rate of simple interest for 2 yr. He lent this sum to Ram at the same rate of interest compounded annually for the same period. At the end of two years, he received Rs 4200 as compound interest but paid Rs 4000 only as simple interest, find the rate of interest.

Solution:

Let the money borrowed be Rs x and rate be $r\%$. and Time = 2 yr

So, $4000 = x * r * 2 / 100 \Rightarrow rx = 200000$

and $x(1 + r/100)^2 = x + 4200$

$\Rightarrow x + xr^2/10000 + 2xr/100 = 4200 + x$

$\Rightarrow 20r + 4000 = 4200$

$\Rightarrow r = 10\%$

Q. After having spent 35% of the money on machinery, 40% on raw material and 10% on staff, a person is left with Rs 60000. The total amount of money spent on machinery and raw material is

Solution:

Let the original money be Rs 100, then money spent on machinery = Rs 35

Money spent on raw material = Rs 40

Money spent on staff = Rs 10

Money left = $100 - 85 =$ Rs 15

If money left is Rs 15 original money = 100

If money left is 60000 original money = $100/15 \times 60000 = 400000$

Hence the total money spent on machinery and raw material = $400000 \times 75\% =$ Rs 300000

Q. A firm of ready made garments makes both men's and women's shirts. Its average profit is 6% of the sales. Its profit in men's shirts average 8% of the sales and women's shirts comprise 60% of the output. The average profit per sales rupee in women's shirts is :

Solution:

According to the question,

Women's shirts comprise 60% of the output.

→Men's shirts comprise 40% of the output.

→Average profit from men's shirts = 8% of 40 = 3.2 out of 40

Overall average profit = 6 out of 100

Average profit from women's shirts = 2.8 out of 60,

i.e., 0.0466 out of each shirt

Q. A small aeroplane can travel at 320 km/h in still air. The wind is blowing at a constant speed of 40 km/h. The total time for a journey against the wind is 135 min. What will be the time in minutes for the return journey with the wind? (Ignore take off and landing time for the aeroplane)

Solution:

According to the question,

Speed of aeroplane against the wind = $(320 - 40) = 280$ km/h

Let the distance be x km.

Then, $135/60 = x/280$

$\Rightarrow x = 630$ km

Speed of Aeroplane with the wind = $(320 + 40) = 360$ km/h

Time taken by aeroplane with the wind = $630/360 \times 60$ min = 105 min

Q. The height of a room is 40% of its semi-perimeter. It cost Rs 260 to paper the walls of the room with paper 50 cm wide at the rate of Rs 2 per m allowing an area of 15 m² for doors and windows. The height of the room is

Solution:

Let the length, breadth and height of the room be l , b and h respectively.

Then, $h = 0.4 (l + b)$

Area of the four walls = $2 (l + b) h = 2 (l + b) \times 0.4 (l + b) = 0.8 (l + b)^2$

Required area where paper has to be pasted = $4/5 (l + b)^2 - 15$

Now, area of paper = area of wall Length \times breadth = $4/5 (l + b)^2 - 15$

$$\text{Length} = [4/5 (l + b)^2 - 15]/(1/2)$$

$$\text{Given, } 2[4/5 (l + b)^2 - 15] \times 2 = 260$$

$$\Rightarrow 16/5 (l + b)^2 - 60 = 260$$

$$\Rightarrow 16/5 (l + b)^2 = 320$$

$$\Rightarrow (l + b)^2 = 100$$

$$\Rightarrow l + b = 10$$

$$\text{So, } h = 0.4 \times 10 = 4\text{m}$$

Q. A shopkeeper gives 3 consecutive discounts of 10%, 15% and 15% after which he sells his goods at a percentage profit of 30.05% on the cost price. Find the value of the percentage profit that the shopkeeper would have earned if he had given discounts of 10% and 15% only:

Solution:

$$\text{Let CP} = \text{Rs } 100, P = 30.05\%$$

$$\therefore \text{S.P.} = \text{Rs } 130.05$$

$$\text{Discounts} = 10\%, 15\%, 15\% \therefore \text{M.P.} = 130.05 \times 100/90 \times 100/85 \times 100/85 = \text{Rs } 200$$

If discounts are 10% and 15% only

$$\therefore \text{S.P.} = \text{M.P.} \times \{(100-d1)/100\} \times \{(100-d2)/100\}$$

$$\Rightarrow 200 \times 90/100 \times 85/100 = \text{Rs. } 153$$

$$\text{So, Profit} = 53\%$$

Q. A journey of 192 kms takes 2 hours less by a fast train than by a slow train. If the average speed of the slow train is 16 kmph less than that of a fast train, what is the average speed of the fast train?

Solution:

$$\{192/(x-16)\} - 192/x = 2$$

$$\Rightarrow \text{Speed of the fast Train} = 48 \text{ kmph}$$

Q. Two planes move along a circle of circumference 1.2 kms with constant speeds. When they move in different directions, they meet every 15 seconds and when they move in the same direction one plane overtakes the other every 60 seconds. Find the speed of the slower plane:

Solution:

Let the speeds of fast plane and slow planes be x and y m/sec respectively $D = s \times t$

If they move in opposite direction

$$15(x + y) = 1200 \Rightarrow x + y = 80 \text{ m/sec ... (i)}$$

If they move in same direction, relative speed = $x - y$ m/sec

Time = 60 i.e. 4 times

$$\therefore \text{Speed is } (1/4)\text{th } x - y = 20 \text{ m/sec ... (ii)}$$

Solving (i) and (ii),

$$y = 50 \text{ m/sec} = 0.05 \text{ km/sec}$$

Q. A man purchased a bag of rice containing 70 kgs for Rs 175. He sold it at the rate of Rs 2.75 per kg. Find the profit and loss per cent.

Solution:

$$\text{C.P. of 70 kg rice} = \text{Rs } 175$$

$$\text{S.P.} = 2.75 \times 70 = 385/2$$

$$P = 385/2 - 175 = 35/2$$

$$\therefore P\% = 35/2 \times 1/175 \times 100 = 10\%$$

Q. It costs Re. 1 to photocopy a sheet of paper. However, 2% discount is allowed on all photocopies done after first 1000 sheets. How much will it cost to copy 5000 sheets of paper?

Solution:

$$\text{Total cost} = \text{Rs. } [1 \times 1000 + (100 - 2)\% \text{ of } 1 \times 4000]$$

$$\Rightarrow \text{Rs. } (1000 + 0.98 \times 4000)$$

$$\Rightarrow \text{Rs. } (1000 + 3920) \Rightarrow \text{Rs. } 4920.$$

Q. Saurabh sells 4/9th of his candies at 27% profit and rest at cost price. Find the overall profit% in the transaction if selling price of 1 candy is Rs.9 and total candies he have is 126?

Solution:

4/9 candies at 27% profit and rest candies (i.e. 5/9) candies at CP (means profit = 0)

$$\text{Overall Profit\%} = (4/9 \times 27) + (5/9 \times 0)$$

$$\text{Overall profit\%} = 12\%$$

Q. Sameer sells 1/3rd of his pencils at 36% profit. At what loss% he sells his remaining pencils so as to gain 10% profit overall?

Solution:

Let, he sells remaining pencils at x% loss.

$$(1/3 * 36) - (2/3 * x) = 10$$

$$12 - 2x/3 = 10$$

$$X = 3$$

Q. In an election between two candidates, one got 45% of the total valid votes, 20% of the votes were invalid. If the total number of votes was 7500, the number of valid votes that the other candidate got, was:

Solution:

Number of valid votes = 80% of 7500 = 6000.

Valid votes polled by other candidate = 55% of 6000 = $[(55/100) \times 6000] = 3300$.

Q. While purchasing one item costing Rs.400, I had to pay the sales tax at 7% and on another costing Rs.6400; the sales tax was 9%. What percent of the sales tax I had to pay, taking the two items together on an average?

Solution:

Total sales tax paid = 7% of Rs. 400 + 9% of Rs. 6400

Total sales tax paid = Rs. 604

Total cost of the items = Rs. (400 + 6400) = Rs. 6800.

Required Percentage = $604/6800 * 100 = 8 (15/17)\%$

Q. 50 g of an alloy of gold and silver contains 80% gold (by weight). The quantity of gold, that is to be mixed up with this alloy, so that it may contain 95% gold, is

Solution:

In 50 gms, Gold and Silver in the ratio = 80:20

So, Gold = 40 gms

Silver = 10 gms

Let quantity of gold be mixed up be "x"

SO,

$$(40+x)/(50+x) = 95/100$$

$$X = 150 \text{ gms}$$

Q. A house worth 1,50,000 is sold by X at a 5% profit to Y. Y sells the house back to X at a 2% loss. Then in the entire transaction X will gain or loss?

Solution:

Rs. $150000 \times 105/100 = 157500$ (X sells to Y at a profit of 5%)

Rs. $157500 \times 98/100 = 154350$ (Y resells to X at a loss of 2%)

X gains = Rs. $157500 - 154350 =$ Rs. 3150

Q. In a competitive examination in State A, 6% candidates got selected from the total appeared candidates. State B had an equal number of candidates appeared and 7% candidates got selected with 80 more candidates got selected than A. What was the number of candidates appeared from each State?

Solution:

State A and State B had an equal number of candidates appeared.

In state A, candidates got selected = 6%

In state B, candidates got selected = 7%

Difference between the selected candidates from state A and B = 1%

This 1% is given which is equal to = 80

So, 100% will be equal to = $80 \times 100 = 8000$

Total appeared candidates in State A = total appeared candidates in State B = 8000

Q. Simi went to the stationers and bought things worth Rs. 25, out of which 30 paise went on sales tax on taxable purchases. If the tax rate was 6%, then what was the cost of the tax free items?

Solution:

Let the amount of taxable purchases be Rs.x.

Then, 6% of x = $30/100$

$6/100 * x = 30/100$

$x = (30/100 \times 100/6) = 5.$

Cost of tax free items = Rs. $[25 - (5 + 0.30)] =$ Rs. 19.70

Q. 10% of the voters did not cast their vote in an election between two candidates. 10% of the votes polled were found invalid. The successful candidate got 54% of the valid votes and won by a majority of 1620 votes. The number of voters enrolled on the voters list was

Solution:

Let total voters = V

No. of voters who cast their vote = $0.9 * V$

Valid votes = $0.9 * 0.9 * V = 0.81 * V$

Winner got 54% & loser got 46% i.e a difference of 8% or 0.08.

SO,

$$0.08 * (0.81 * V) = 1620$$

$$V = 25000.$$

Q. 8% of the people eligible to vote are between 18 and 21 years of age. In an election, 85% of those eligible to vote, who were between 18 and 21, actually voted. In that election, the number of persons between 18 and 21, who actually voted, was what percent of those eligible to vote?

Solution:

Let the number of persons eligible to vote be x. Then,

Number of eligible persons between 18 and 21 = 8% of x.

Number of persons between 18 and 21, who voted = 85% of (8% of x)

$$85/100 * 8/100 * x = 68x/1000$$

$$\text{Required percentage} = 68x/1000 * 1/x * 100 = 6.8\%$$

Q. Pragma spends 24% of her monthly income on food and 15% on the education of her children. Of the remaining salary, she spends 25% on entertainment and 20% on conveyance. She is now left with Rs. 10,736. What is the monthly salary of Pragma?

Solution:

Let the monthly salary of Pragma be Rs. 'a'.

$$\text{Then, } [100 - (25 + 20)]\% \text{ of } [100 - (24 + 15)]\% \text{ of } a = 10736$$

$$55\% \text{ of } 61\% \text{ of } a = 10736 \text{ ---> } a = 32000$$

Q. To do a piece of work B would take 3 times as long as A & C together and C twice as long as A & B together. The three men by their united exertion can complete the work in 10 days. How long would it take for each to do it himself?

Solution:

$$B:(A+C) = 3x:x$$

$$C:(A+B) = 2y:y$$

$$1/3x + 1/x = 1/10$$

$$x = 40/3$$

So,

$$B = 40 \text{ days and } A+C = 40/3 \text{ days}$$

$$1/2y + 1/y = 1/10$$

$$y = 15$$

$$C = 30 \text{ days and } A+B = 15 \text{ days}$$

$$\text{Now, } A+B+C = 10 \text{ days and } B = 40 \text{ days and } C = 30 \text{ days}$$

$$1/A = 1/10 - (1/40 + 1/30) = 1/24$$

$$A = 24 \text{ days}$$

Q. Hariharan goes to a shop to buy an FM radio costing Rs. 1404 including sales tax at 8%. He asks the shopkeeper per to reduce the price of the radio so that he can save the amount equal to the sales tax. The reduction of the price of the radio is:

Solution:

Save amount equal to sales tax = 8%

108% value is given which is equal to = 1404

So, 8% will be equal to = $1404/108 * 8 = 104$

Q. Two trains Amrapali express and Barouni express simultaneously started on two parallel tracks from Meerut to Nagpur, which are 390 km apart. The ratio of the speed of Amrapali express and Barouni express is 6 : 7. After how long (in kms) travelling, Barouni express exchanges the speed with Amrapali express so that both the trains reach at their destination simultaneously:

Solution:

They reach their destination simultaneously means they both are taking the same time. Means time is same for both and hence Distance is directly proportional to speed.

Distance by Barouni train = $7/13 * 390 = 210\text{Km}$

Q. The charges per hour of internet surfing is increased by the 25% then find the percentage decrease in the time period of surfing of a user (a net savy) who can afford only a 10% increase in the expenditure:

Solution:

time * rate = total charges

Let time be 1hr, rate be 10

$$1 * 10 = 10$$

Increment in rate is 25% → 12.5

Increment in total charges 10% → 11

$$T * 12.5 = 11$$

$$T = 11 \times 100 / 12.5$$

$$T = 88\%$$

Thus decrease in time = 12%

Q. An alloy contains the Copper and Aluminium in the ratio of 7:4. While making the weapons from this alloy, 12% of the alloy gets destroyed. If there is 12kg of aluminium in the weapon, then the weight of the alloy required is:

Solution:

Aluminium is $4x$ which is equal to 12 kg (when 12% alloy gets destroyed)

$$4x = 12 \longrightarrow x = 3$$

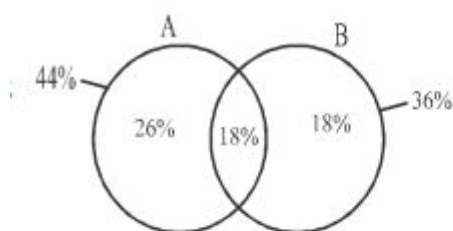
Total alloy = $7x + 4x = 11x = 11 \times 3 = 33$ Kg (This weight is equal to 88%)

88% is equal to 33

So, 100% will be equal to = $33/88 \times 100 = 37.5$ kg

Q. In an examination, 44% of students failed in subject A and 36% of the students failed in subject B and 18% failed in both the subjects. If 352 students passed in only one subject, then how many failed in both the subjects?

Solution:



Students passed in one subject also means that they have failed in one subject. % of no of student passed in one subject only = $26 + 18 = 44\%$

$$44\% \quad - \quad 352$$

$$100\% \quad - \quad 800$$

$$\text{Total Students} \quad - \quad 800$$

$$\text{Failed in both} \quad - \quad 800 \times \frac{18}{100} = 144$$

Q. A shopkeeper allows two successive discounts of 10% and 5% on the marked price of an article but charges a sales tax of 5% on the discounted price. If a customer pays Rs. 718.2 as including the sales tax, then what is the marked price?

Solution:

$$\begin{aligned} \text{Total discount} &\Rightarrow -10 - 5 + \frac{10 \times 5}{100} \\ &\Rightarrow 14.5\% \end{aligned}$$

$$\therefore SP + SP \times \frac{5}{100} = 718.2$$

$$\text{or, } \frac{105}{100} SP = 718.2$$

$$\text{or, } SP = \frac{71820}{105}$$

$$\therefore SP = 684$$

$$\text{Now, marked price} = \frac{684}{(100 - 14.5)} \times 100$$

$$\text{Marked price} = 800$$

Q. The ratio of present ages of A and C is 7 : 9 and present age of B is equal to the average ages of A and C after 2 years. If the ratio of present age of B and age of C after four years is 6 : 7 then what will be the ratio of age of A after four years to that of present age of B?

Solution:

Let the ages of A and C be $7x$ and $9x$

$$B = \frac{7x + 2 + 9x + 2}{2} = 8x + 2$$

$$\text{Given, } \frac{8x + 2}{9x + 4} = \frac{6}{7} \quad \therefore x = 5$$

$$\begin{aligned} \text{Age of } A &= 35 \\ B &= 42 \\ C &= 45 \end{aligned}$$

$$\therefore \text{Required} = \frac{35 + 4}{42} = \frac{39}{42} = 13 : 14$$

Q. In a two-digit numbers the digit in the unit's place is less than twice the digit in ten's place by 1 and the difference between the number obtained by interchanging its digit and the original number is half the number by adding 7 to original number. Then the sum of its digit is.

Solution:

Let the unit digit be y and ten digit be x

Then,

$$y = 2x - 1 \quad \dots\dots\dots (I)$$

$$\begin{aligned} \text{Difference} &= 10y + x - (10x + y) \\ &= 9y - 9x \end{aligned}$$

$$\text{Now, } 9(y - x) = \frac{10x + y + 7}{2}$$

$$\text{or, } 17y - 28x = 7 \quad \dots\dots\dots (II)$$

Solving (I) & (II) $x = 4, y = 7$

Number = 47

Sum = $4 + 7 = 11$

Q. 7 litres are drawn from a beaker full of spirit then filled with water. The operation is performed 2 more times. The ratio of quantity of spirit now left in the beaker to that of water is 27 : 37. How much spirit did the beaker hold in original?

Solution:

Let the volume of beaker be V ltrs

$$\Rightarrow \frac{2}{64} = \left(\frac{V-7}{V}\right)^3 \Rightarrow \frac{3}{4} = \frac{V-7}{V} \Rightarrow V = 28 \text{ litres}$$

Q. The area of a rectangular field is 320 sq metres. If the length is 25 per cent more than the breadth, what is the breadth of the rectangular field?

Solution:

Let the breadth by x metres. Then Length = $x \times 125/100 = 5x/4$ metres

$$\text{Now area} = lb \Rightarrow x \times 5x/4 = 320 \Rightarrow x^2 = 320 \times 4/5 \Rightarrow x = 16 \text{ metres}$$

Q. When the price of every scooter was increased by 20%, the sales of scooter decreased by 20%. What was the net effect on the revenue?

Sol. Let the original price be x and sale be of y units.

Then, the revenue collected initially = $x \times y$

Now, new price = $1.2x$, new sale = $0.8y$

Then, new revenue collected = $0.96 \times x \times y$.

$$\% \text{ Change in revenue} = \frac{0.96xy - xy}{xy} \times 100 = -4.$$

Hence revenue will decrease by 4%

Q. A student scored 20% of maximum marks and failed by 26 marks and when he scores 40% of the marks in the same paper he passes by 14 marks. Then find the maximum marks?

Solution:

Let the maximum marks be M , then $(40 - 20) \%$ of maximum marks will equal to $26 + 14 = 40$ marks.

$$\text{Therefore } 20\% \times M = 40 \text{ or } M = 200$$

Q. Ram could save 20% of his income. But two years later when his income is increased by 10%, he could save the same amount only as before. By how much percent has his expenditure increased?

Solution:

Let original income = Rs. 100. Then, saving = Rs. 20 and expenditure = Rs. 80

New income = Rs. 110, New saving = Rs. 20

New expenditure = Rs. 90

Increase in expenditure = Rs. 10.

\therefore Increase % = $(10/80 \times 100)\% = 12.5\%$

Q. If the radius of the cone is increased by 10% and the height of the cone is decreased by 20%, then find the percentage change of the volume of the cone?

Sol. Initial volume = $\frac{1}{3} \times \pi \times r^2 \times h$, and the changed volume of the cone
 $= \frac{1}{3} \times \pi \times (1.1)^2 \times r^2 \times (0.8) \times h$.

Therefore, percentage change in volume will be given by the expression

$$\frac{(0.968 - 1) \times \pi \times r^2 \times h}{\pi \times r^2 \times h} \times 100$$

$\Rightarrow 3.2\%$ decrease.

Q. A started a business with Rs. 45000 and another person B joined after some period with Rs. 30000. Determine this period after B joined the business if the profit at the end of the year is divided in the ratio 2:1.

Solution:

In partnership problems profit earned is directly proportional to the product of Investment and Time period for which investment was made in the partnership business. Let B joins after 'x' months of the start of the business.

$$\Rightarrow (45,000 \times 12) : 30,000 \times (12 - x) = 2 : 1$$

$$\therefore (45,000 \times 12) \times 1 = 30,000 \times (12 - x) \times 2 \Rightarrow x = 3$$

Thus, B joined after 3 months

Q. How much water be added to 60 litres of milk so that the price of the mixture becomes Rs. 20 per litre. Given that price of the milk is Rs. 25 per litre.

Solution:

Assuming price of the water as 0, suppose x litres of water must be added to milk so that mean price of the mixture becomes Rs. 20, hence

$$\frac{60 \times 25}{x + 60} = 20$$

$$\Rightarrow 20x + 1200 = 1500 \Rightarrow x = 15.$$

Q. The simple interest on a sum of money is $\frac{4}{9}$ of the principal and the number of years is equal to the rate per cent per annum. The rate per annum is:

Sol. Let the sum of money be P

$$I = \frac{P \times R \times T}{100} \Rightarrow \frac{4}{9} P = \frac{P \times R \times T}{100}$$

$$\therefore R = \sqrt{\frac{400}{9}} = \frac{20}{3} = 6\frac{2}{3}\%$$

Q. A sum of money is put at compound interest for 2 years at 20% p.a. It would fetch Rs. 964 more, if the interest were payable half-yearly, than if it were payable yearly. Find the sum.

$$\text{Sol. } A = P \left(1 + \frac{r}{100 \times k}\right)^{k \times t}$$

A = Amount, P = Principal, r = rate of interest, t = time, k = Compounding frequency.
Therefore, from given information,

$$P \left(1 + \frac{20}{100 \times 2}\right)^{2 \times 2} - P \left(1 + \frac{20}{100 \times 1}\right)^{1 \times 2} = 964$$

$$\Rightarrow P (1.4641 - 1.44) = 964 \Rightarrow P = 40000.$$

Q. Anita and Bindu can do a job in 16 days and 12 days respectively. 4 days before finishing the job, Anita joins Bindu. Bindu has started the work alone. Find how many days Bindu has worked alone?

Solution:

Let Bindu worked alone for T days. Also Anita's 4 days work + Bindu's (T + 4) days work equals the total work.

$$\left(\frac{4}{16} + \frac{T+4}{12}\right) = 1 \Rightarrow T = 5$$

Q. A contractor undertakes to build a wall in 40 days. He employs 50 people for the same. However after 20 days he finds that only 40% of the work is completed. How many more men need to be employed to complete the work in time?

Solution:

According to the given information, 50 men completed 0.4 work in 20 days and (M + 50) men should complete the remaining $1 - 0.4 = 0.6$ work in remaining time i.e. $40 - 20 = 20$ days [Note: M has been assumed as additional men required]

Applying the work rule, $m_1 \times d_1 \times w_2 = m_2 \times d_2 \times w_1$

$$\Rightarrow 50 \times 20 \times 0.6 = (M + 50) \times 20 \times 0.4 \Rightarrow M = 25$$

Q. 10 men can complete a piece of work in 15 days and 15 women can complete the same work in 12 days. If all the 10 men and 15 women work together, in how many days will the work get completed?

Solution:

10 men's 1 day work = $1/15$;

15 women's 1 day work = $1/12$.

(10 men + 15 women)'s 1 day work

$$= \left(\frac{1}{15} + \frac{1}{12}\right) = \frac{9}{60} = \frac{3}{20}$$

Therefore 10 men and 15 women will complete the work in $20/3 = 6(2/3)$ days.

Q. Three pipes A, B and C can fill separately a cistern in 10, 12 and 15 minutes respectively. A was opened first. After 1 minute, B was opened and after 2 minutes from the start of A, C was also opened. Find the time when the cistern will be full?

Solution:

Let the cistern will be full in T minutes. Then Part filled by A in T min + part filled by B in (T - 1) min + Part filled by C in (T - 2) min = 1

$$\Rightarrow \frac{T}{10} + \frac{T-1}{12} + \frac{T-2}{15} = 1 \Rightarrow T = 4\frac{13}{15}$$

Q. Seven students are to sit at one side of a straight table. Find the probability of two particular students sitting together.

Solution:

7 students can sit in 7! ways.

∴ Total ways = 7!

Now consider two particular students as one, then they can sit in 6! Ways.

But these two students can interchange their seats.

∴ Favourable case = $2 \times 6!$

$$\text{Hence probability} = \frac{2 \times 6!}{7!} = \frac{2}{7}$$

Q. The sum of five consecutive even numbers is equal to 170. What is the sum of the second largest number amongst them and the square of the smallest number amongst them together?

Solution:

Let the five consecutive even numbers are $2x, 2x + 2, 2x + 4, 2x + 6, 2x + 8$ respectively.

According to the question,

$$2x + 2x + 2 + 2x + 4 + 2x + 6 + 2x + 8 = 170$$

$$10x + 20 = 170$$

$$10x = 150$$

$$x = 150/10 = 15$$

∴ The five numbers are 30, 32, 34, 36, 38 respectively.

∴ Required sum = $(30)^2 + 36 = 900 + 36 = 936$

Q. The area of a square is four times area of a rectangle. The length of the rectangle is 25 cm and its breadth is 1 cm less than one-fifth its length. What is the perimeter of the square?

S2. Ans.(b)

Sol. Length of rectangle = 25 cm

$$\therefore \text{Breadth} = \frac{1}{5} \times \text{Length} - 1$$

$$= \frac{25}{5} - 1 = 5 - 1 = 4 \text{ cm}$$

Given, area of the square = 4 × Area of a rectangle

$$(\text{Side})^2 = 4 \times (25 \times 4)$$

$$\Rightarrow (\text{side})^2 = 400 \text{ cm}^2$$

$$\Rightarrow \text{Side} = \sqrt{400} = 20 \text{ cm}$$

Hence, perimeter of the square = 4 × side

$$= 4 \times 20 = 80 \text{ cm}$$

Q. Sohan got 54 marks in Hindi, 65 marks in Science, 89 marks in Maths, 69 marks in Social Science and 68 marks in English. The maximum marks of each subject are 100. How much overall percentage of marks did he get?

Solution:

$$\text{Marks in all subjects} = 54 + 65 + 89 + 69 + 68 = 345$$

$$\text{Total maximum marks} = 5 \times 100 = 500$$

$$\therefore \text{Required percentage} = \frac{345}{500} \times 100 = 69\%$$

Q. 8 women can complete a piece of work in 15 h. In how many hours will 12 women complete the same piece of work?

Solution:

8 women can complete a piece of work in = 15 h

1 woman can complete a piece of work in = (15×8) h = 120 h

\therefore 12 women can complete a piece of work in = $120/12 = 10$ h

Q. The length of a rectangle is 24 cm which is 10 cm more than the diameter of a circle. What is the area of the circle?

Solution:

Diameter of a circle = $24 - 10 = 14$ cm

\therefore Radius of a circle = $14/2 = 7$ cm

\therefore Area of a circle = $\pi r^2 = 22/7 \times 7 \times 7 = 154$ sq cm

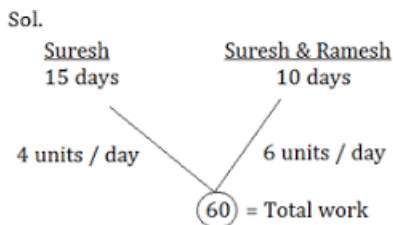
Q. A work could be completed in 100 days by some workers. However, due to the absence of 10 workers, it was completed in 110 days. The original number of workers was

$$\begin{aligned}\text{Sol. } M_1 \times D_1 &= M_2 \times D_2 \\ M_1 \times 100 &= (M_1 - 10) \times 110 \\ \Rightarrow M_1 &= 110\end{aligned}$$

Q. A can write 75 pages in 25 hrs. A and B together can write 135 pages in 27 hrs. In what time can B write 42 pages?

$$\begin{aligned}\text{Sol. A can copy } \frac{75}{25} &= 3 \text{ pages in 1 hr.} \\ \text{A + B can copy } \frac{135}{27} &= 5 \text{ pages in 1 hr.} \\ \therefore \text{B can copy } 5 - 3 &= 2 \text{ pages in 1 hr.} \\ \therefore \text{B can copy 42 pages in } \frac{42}{2} &= 21 \text{ hrs.}\end{aligned}$$

Q. Suresh can do a work in 15 days. Suresh and Ramesh together do the same work in 10 days. If they are paid Rs. 1500 for the work, how should the money be divided between them?



Clearly, Ramesh efficiency = 2 units/day
 Suresh efficiency = 4 units/day
 So, the money will be distributed in same ratio i.e. 4:2 or 2:1
 So, their shares are Rs. 1000, Rs. 500

Q. A tank has a leak which would empty it in 8 hrs. A tap is turned on which admits 6 litres a minutes into the tank, and it is now emptied in 12 hrs. How many litres does the tank hold?

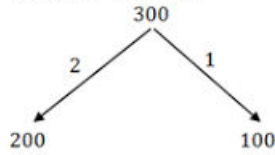
$$\begin{aligned}\text{Sol. The filler tap can fill the tank in } &= \frac{12 \times 8}{12 - 8} = 24 \text{ hrs.} \\ \therefore \text{Capacity of tank} &= 24 \times 60 \times 6 = 8640 \text{ litres.}\end{aligned}$$

Q. A pipe can fill a tank in 12 minutes and another pipe in 15 minutes, but a third pipe can empty it in 6 minutes. The first two pipes are kept open for 5 minutes in the beginning and then the third pipe is also opened. In what time is the cistern emptied?

$$\begin{aligned}\text{Sol. Cistern filled in 5 minutes} &= 5 \left(\frac{1}{12} + \frac{1}{15} \right) = \frac{3}{4} \\ \text{Net work done by 3 pipes in 1 minute} &= \left(\frac{1}{12} + \frac{1}{15} \right) - \frac{1}{6} = -\frac{1}{60} \\ \text{-ve sign shows that } \frac{1}{60} \text{ part is emptied in 1 minutes} & \\ \therefore \frac{3}{4} \text{ part is emptied in } 60 \times \frac{3}{4} &= 45 \text{ min.}\end{aligned}$$

Q. A train travelling at 48 km/hr crosses another train, having half its length and travelling in opposite direction at 42 km/hr in 12 seconds. It also passed a railway platform in 45 second. The length of the railway platform is

Sol. Total speed = $(48 + 42)$ km/hr.
 $= (48 + 42) \times \frac{5}{18} = 25$ m/sec.
 Total length of both train = $S \times T$
 $= 25 \times 12 = 300$ m.



Ratio is 2 : 1 as length of 2nd is half of the of 1st
 Distance in 45 sec. by 1st train
 $D = S \times T = 48 \times \frac{5}{18}$ m/sec. $\times 45$ sec.
 $= 600$ m.
 $D = L_T + L_p$
 Length of platform = $600 - 200 = 400$ m.

Q. A boat travels upstream from P to Q and downstream from Q to P in 3 hours. If the speed of the boat in still water is 9 km/hr and the velocity of the stream is 3 km/hr, then what is the distance from P to Q?

Sol. Distance between P and Q
 [Here, $t = 3$, $u = 9$ and $v = 3$]
 $= \frac{t(u^2 - v^2)}{2u} = \frac{3 \times (9^2 - 3^2)}{18} = 12$ km.

Q. Two buses start at the same time from two bus stations and proceed towards each other at the rate of 20 km/hr. and 25 km/hr. respectively. When they meet one bus may have travelled 80 kms more than the other. Find the distance between the two bus stations.

Sol. $D_1 = 20 \times T_1$
 $D_2 = 25 \times T_2$
 $D_2 - D_1 = 80$ kms
 $T_1 = T_2$ (both travel for the same time)
 $25T_1 - 20T_1 = 80$
 $5T_1 = 80$
 $T_1 = \frac{80}{5} = 16$
 $D_2 = 25 \times 16 = 400$ kms.
 $D_1 = 320$ kms.
 Total distance = $400 + 320 = 720$ kms.

Q. A thief is spotted by a policeman from a distance of 200 metres. When the policeman started running after the thief, the thief also started running. Assuming the speed of the thief to be 10 km/hr. and that of policeman 12 km/hr, how far will the thief have run before he is overtaken by the policeman?

S10. Ans.(a)
 Sol. Relative speed of the policeman with respect to thief = $12 - 10$
 $= 2$ km/hr.
 \therefore Time = $\frac{D}{S} \Rightarrow \frac{200 \text{ m}}{2 \text{ km/hr.}} = \frac{200 \times 18}{2 \times 5}$
 $= 360$ seconds or $\frac{1}{10}$ hr.
 The distance thief had run before he was caught by the policeman
 $10 \times \frac{1}{10} = 1$ km.

Q. The ratio of incomes of two persons is 5 : 3 and that of their expenditures is 9:5. If they save Rs. 2600 and Rs. 1800 respectively, their incomes are

S11. Ans.(a)

Sol. Let incomes are $5x$ and $3x$ and expenditures are $9y$ & $5y$.

According to question

$$5x - 9y = 2600 \quad \dots(i)$$

$$3x - 5y = 1800 \quad \dots(ii)$$

$$3\{5x - 9y = 2600\}$$

$$\underline{5\{3x - 5y = 1800\}}$$

$$15x - 27y = 7800$$

$$\underline{-15x + 25y = -9000} \quad \text{(on subtracting)}$$

$$-2y = -1200$$

$$y = 600$$

Putting the value of y in equation (i)

$$x = 1600$$

\therefore Incomes are Rs. 8000 and Rs. 4800.

Q. In a garden, the ratio of the number of coconut trees to that of mango trees is 5:6 respectively. If the total number of trees is 121, then how many coconut trees are there in the garden?

S12. Ans.(d)

Sol. Total number of trees = 121

Ratio of the number of coconut trees to that of mangoes trees = 5 : 6

\therefore Total number of coconut trees

$$= \frac{5}{11} \times 121 = 5 \times 11 = 55$$

Q. Michelle got married 9 years ago. Today her age is $\frac{4}{3}$ times of her age at the time of marriage. At present her daughter's age is one-sixth of her age. What was her daughter's age two years ago?

S13. Ans.(e)

Sol. Let the present age of Michelle be ' x ' years.

9 years ago, the age of Michelle

$$= (x - 9) \text{ years}$$

According to question

$$x = 1\frac{1}{3} \times (x - 9)$$

$$\Rightarrow x = \frac{4}{3}(x - 9)$$

$$\Rightarrow 3x = 4(x - 9)$$

$$\Rightarrow 3x = 4x - 36$$

$$\Rightarrow 4x - 3x = 36$$

$$\Rightarrow x = 36$$

\therefore Present age of Michelle = 36 years

\therefore Present age of her daughter

$$= \frac{1}{6} \text{ of present age of Michelle}$$

$$= \frac{1}{6} \times 36 \text{ years} = 6 \text{ years}$$

Her daughter age two years ago

$$= (6 - 2) = 4 \text{ years}$$

Q. A man sells two articles for Rs. 1710. He earns 10% loss on the first article and 25% profit on the 2nd article. If the C.P. of 1st article is equal to selling of the 2nd article, find profit or loss%

S14. Ans.(c)

Sol. Given

1st 2nd

C. P.₁ C. P.₂

1710 – S. P. S. P.

$$C. P._1 = S.P. = (1710 - S.P.) * 100/90$$

$$S.P. = 900$$

$$\text{So, } C. P._2 = 900 * 100 / 125 = 720$$

$$\text{Total CP} = 720 + 900 = 1620$$

$$\text{Profit} = 1710 - 1620 = 90$$

Q. A wholesale dealer sell 40 pens at the M.P. of 36 pens and the retailer sells them to customer at 1% discount. Find its profit%?

S15. Ans.(d)

Sol. Let S.P. of 40 pens = 40/- → C.P. of retailer

$$\text{M.P. of 40 pens} = \frac{40 \times 40}{36} = \frac{1600}{36} = \frac{400}{9}$$

$$\text{S.P. (after 1% discount)} = \frac{99}{100} \times \text{M.P.}$$

$$= \frac{99}{100} \times \frac{400}{9} = 11 \times 44 = 44/-$$

$$P = \frac{P}{C.P.} \times 100$$

$$\frac{44 - 40}{40} \times 100 = 10\%$$