

1. Rahul invested 20% more than Mohit. Mohit invested 10% less than Raghu. If the total sum of their investment is Rs.17880, how much amount did Raghu invest?

Answer:

Let the investment made by Raghu be $100x$, so Mohit's investment = $90x$ and rahul's investment = $108x$

$$108x+90x + 100x = 298x = 17880$$

$$X=60$$

So, Raghu investment = $100x = \text{Rs.}6000$

2. A, B, C and D are four salesman in the first month they received a commission of Rs.3200 from their company and divided it in the ratio of 2 : 3 : 4 : 7 in the second month the commission doubled, the amount was doubled in the ratio 3 : 4 : 5 : 4. In the third month the commission tripled when compared to the first month and they shared in the ratio of 4 : 7 : 3 : 2 and in the fourth month the commission became half of the previous month and they shared it in the ratio of 4 : 3 : 5 : 4 . What was the average monthly earning of C over the period?

Answer:

Total commission in first month = Rs.3200

Total commission in second month = Rs.6400

Total commission in thired month = Rs. 9600

Total commission in fourth month = Rs.4800

"C's share in the commission =" $4/16$ of 3200+ $5/16$ of 6400+ $3/16$ of 9600+ $5/16$ "of 4800"

$$=800 + 2000 + 1800 + 1500 = \text{Rs.}6100$$

"C's average monthly earnings =" $"6100" / 4 = \text{Rs.}1525."$

3. Two shops A and B marked the same brand of jeans for Rs.900. Shop A offers successive discounts of 15% and 15% While shop B offers successive discounts of 20% and 10%. Then the difference in the selling price of jeans is?

Answer:

Final selling price of jeans in shop A = $(900- 900 \times 0.15) - (900-900 \times 0.15) \times 0.15 = \text{Rs.} 650.25$

Final selling price of jeans in shop B = $(900-900 \times 0.20) - (900-900 \times 0.20) \times 0.10 = \text{Rs.}648$

Difference = Rs.2.25

4. Let us assume that 20g of sugar dissolves in 100g of water. Even an extra pellet will remain undissolved and sediment at the bottom of the solution. Now, water starts evaporating from 1kg of 7% solution at the rate of 32.5g per hour. After how long will the sediments start to evaporate?

Answer:

Sedimentation occurs when more than 20g of sugar is present in 100g of water.

Amount of sugar in 1kg of water = 70g

"Amount of water needed for sedimentation to start =" $"70x \times 100" / 20 = 350g"$

Amount of water that should evaporate = $1000-350 = 650g$

"Time required for epeporation =" $"650" / "32.5" = 20 \text{ hours.}"$

5. Two liquids A and B are in ratio 4:1 in container X and 3:5 in container Y. In what ratio should the content of both container be mixed so that the resulting mixture has A and B in ratio 2:3?

Answer:

Let the ratios in which they are mixed is x and y

Therefore $A=4/5x+3/8y$

$B=1/5x+5/8y$

Now $A/B=2/3$

On solving we get $x:y=1:16$

6. 8 women can complete the work in 10 days and 5 men can complete the work in 8 days where as 25 children can complete in 4 days. 16 women,4 men and 20 children work together for 2 days.If only women were to complete the remaining work in 1 day, how many women would be required?

Answer:

$$(M1)(H1)(D1)/(W1)=(M2)(H2)(D2)/(W2)$$

$$\text{Hence } (8 \times 10)W=(5 \times 8)M=(25 \times 4)C$$

$$4W=2M=5C$$

$$\text{Now } 16W+4M+20C=16W+8W+16W=40W$$

$$8W \text{ one day work}=1/10$$

$$40W \text{ one day work}=(1/10) \times (40/8)=1/2$$

$$40W \text{ 2 day work}=1$$

Remaining Work=0

Work is already completed.

7. A tank has a leak which would empty it in 6 hrs. A tap pumps water @ 8 litres/ minute into the tank, and it is now emptied in 12 hrs. What is the capacity of tank?

Answer:In the absence of leak time taken by tap to fill tank = $12 \times 6 / 12 - 6 = 12$ hourWater filled in 1 hour = $8 \times 60 = 480$ LTherefore water filled in 12 hour = $12 \times 480 = 5760$ L**8. A man borrows Rs. 25,000 at 20% compound interest. At the end of every year he pays Rs. 5000 as part of repayment. How much does he still owe after three such installments?****Answer:**C.I of 20000 in 3 years = $25000 \times (1 + 20/100)^3 = 43200$ Rs

But as we are paying 2000Rs at the end of every year hence that should be subtracted at the end of every year and the CI on remaining amount must be calculated.

Therefore CI of 2000Rs that is paid at the end of 1st year = $5000 \times (1 + 10/100)^2 = 7200$ CI of 2000Rs that is paid at the end of 2nd year = $5000 \times (1 + 10/100)^1 = 6000$ Hence due amount after 3rd payment = $43200 - (7200 + 6000 + 5000) = 25000$ **9. In a triangle, two sides of right angle triangle are 8 cm and 6 cm. If the triangle is revolved along the 8 cm side, the curved surface area of the cone so formed will be****Answer:**

Radius of cone = 8 cm

Slant height = 10 cm

Curved surface area = $\pi r l = 22/7 \times 8 \times 10 = 188.4$ cubic cm**10. Anil and Ruhi started a business by investing Rs 2000 and Rs 2800 respectively. After 8 months, Anil added Rs 600 and Ruhi added Rs 400. At the same time Teena joined them with Rs 4200. Find the share of Teena if they get a profit of Rs 34,300 after a year.****Answer:**

Share of Anil : Share of Ruhi : Share of Teena is

 $2000 \times 8 + 2600 \times 4 : 2800 \times 8 + 3200 \times 4 : 4200 \times 4$

33 : 44 : 21

so share of Teena = $21 / (33 + 44 + 21) \times 34300 = \text{Rs } 7350$ **11. A sum of Rs 7000 is deposited in two schemes. One part is deposited in Scheme A which offers 8% rate of interest. Remaining part is invested in Scheme B which offers 10% rate of interest compounded annually. If interest obtained in scheme A after 4 years is Rs 226 more than the interest obtained in scheme B after 2 years, find the part deposited in scheme B.****Answer:** $(7000 - x) \times 8 \times 4 / 100 = x [(1 + 10/100)^2 - 1] + 226$ $70 \times 8 \times 4 - 32x / 100 = 21x / 100 + 226$ $2240 - 226 = 53x / 100$ $2014 = 53x / 100$ So, $x = \text{Rs } 3800$ **12. A work which is completed by 20 men in 8 days can be completed by 25 women 12 days. 16 men and 10 women start doing the work. After 3 days, they leave. If the remaining work is to be completed in 6 days by x number of men, find x.****Answer:**20 men in 8 days so 16 men in $20 \times 8 / 16 = 10$ days and25 women in 12 days so 10 women in $25 \times 12 / 10 = 30$ daysSo in 3 days, they complete $(1/10 + 1/30) \times 3 = 2/5$ So remaining work = $1 - 2/5 = 3/5$ 20 m 1 work in 8 days and x men $3/5$ work in 6 daysSo $20 \times 8 \times 3/5 = x \times 6 \times 1$ So, $x = 16$ men**13. There are 140 tickets (numbered 1 to 140) in a bowl. Find the probability of choosing a ticket which bears multiple of either 3 or 7.****Answer:**Number of multiples of 3 in 140 = $140/3 = 46$ Number of multiples of 7 in 140 = $140/7 = 20$ Number of multiples of $3 \times 7 = 21$ in 140 = $140/21 = 6$ So required probability = $(46 + 20 - 6) / 140 = 60 / 140 = 3/7$ **14. A 48 litres solution contains liquids water and milk in the ratio 3 : 5. How much amount of milk is to be added so that a amount of milk is 70% of the new solution?****Answer:**Water present in solution = $3/8 \times 48 = 18$ lMilk present in solution = $5/8 \times 48 = 30$ l

Let x litres of milk to be added

Milk is to be 70% of new solution, so water is to be 30% of new solution. So

$30/100$ of new solution = Water present in new solution

$$30/100 * (48+x) = 18$$

So, $x = 12$ litres

OR

$70/100$ of new solution = Milk present in new solution

$$70/100 * (48+x) = 30+x$$

So, $x = 12$ litres

15. In a class, average age of 30 students is 18 years. If the age of 2 more students is taken into consideration, then the average of all students gets increase by 1. Find the average of the ages of those 2 students.

Answer:

30 students – 18

32 students – 19

So total age of those 2 students = $30 \times 1 + 19 \times 2 = 68$

So average = $68/2 = 34$

16. The ratio of A's age 3 years ago and B's age 5 years hence is 3 : 4. The average of the ages of A and C is 20 years. Also C's age after 10 years will be 2 more than twice the age present age of B. Find the age of C.

Answer:

$$(A - 3)/(B + 5) = \frac{3}{4} \Rightarrow 4A - 12 = 3B + 15 \Rightarrow 4A - 3B = 27 \text{ -----> (1)}$$

$$(A + C)/2 = 20 \Rightarrow A + C = 40 \text{ -----> (2)}$$

$$C + 10 = 2B + 2 \Rightarrow B = (C + 8)/2 \text{ -----> (3)}$$

$$\text{From (1) and (2) } (27 + 3B)/4 + C = 40 \text{ -----> (4)}$$

$$\text{From (3) and (4) } (27 + 3(C + 8)/2) + 4C = 160 \Rightarrow C = 22$$

17. The circumference of a circle having radius equal to 35 cm is equal to the perimeter of a rectangle. If the area of rectangle is 2400 cm², find the length of rectangle.

Answer:

$$2 \times 22/7 \times 35 = 2(l + b)$$

$$\text{so } (l + b) = 110$$

$$\text{also given, } lb = 2400$$

$$\text{So } (l + 2400/l) = 110$$

$$\text{So } l^2 - 110l + 2400 = 0$$

$$\text{So, } l = 80 \text{ or } 30.$$

18. The market price of an item is 20% more than its cost price. If after selling the item, the profit percent obtained is 10%, find the discount given.

Answer:

$$\text{Use } MP = (100+p\%)/(100-d\%) * CP$$

So

$$120/100 * CP = (100+10)/(100-d\%) * CP$$

Solve, $d\%$ is $25/3\%$

Let $CP = \text{Rs } 100$, so $MP = \text{Rs } 120$, and $SP = \text{Rs } 110$

So when discount $\% = (120-110)/120 * 100 = 25/3\%$, discount = Rs 10

19. A, B and C divide Rs 3900 among them in the ratio 4 : 4 : 5 respectively. Now if each of them got Rs 300 more, what will be the respective new ratio of dividing the total money among them?

Answer:

$$A \text{ got} = [4/(4+4+5)] * 3900 = 1200, B \text{ got} = [4/(4+4+5)] * 3900 = 1200, C \text{ got} = [5/(4+4+5)] * 3900 = 1500$$

When 300 is added to their shares, A gets= $1200+300 = 1500$, B = 1500, C =1800

So new ratio is $1500 : 1500 : 1800 = 5 : 5 : 6$

20. Mohan distributed his assets to his wife , four sons, three daughters and six grand children in such a way that each grand child got one-sixteenth of each son and one-tenth of each daughter. His wife got 60% of the total share of his sons and daughter together. If each daughter receives assets of worth Rs.1.25 lakh, what is the share of his wife?

Answer:

"Share of 1 grand child = $1/10 \times 1.25 \text{ lakh} = 0.125 \text{ lakhs}$

Share of 1 son = $16 \times 0.125 \text{ lakh} = 2 \text{ lakhs}$

Share of 4 sons = $4 \times 2 \text{ lakhs} = 8 \text{ lakhs}$

Share of 3 daughters = $3 \times 1.25 \text{ lakhs} = 3.75 \text{ lakhs}$

Total share of sons and daughters = $(8+3.75) \text{ lakhs} = 11.75 \text{ lakhs}$

$6/10 \times 11.75 \text{ lakhs} = \text{Rs. } 705000.$

21. There are 3 inlet pipes X, Y and Z connected to a tank. If only one pipe is opened at a time, then it takes 50, 40 and 25 minutes for pipes X, Y and Z respectively to fill the tank. Find the time taken to fill 99% of the tank if it is known that in every 5 minutes for the first 2 minutes pipe Y is opened and then closed for 3 minutes. The remaining pipes are always kept open.

Answer:

Part of the tank filled per minute by pipes X and Z respectively = 2% and 4%

Pipe Y fills 5% of the tank for every 2 minutes it operates.

In 5 minutes, the tank filled by X and Z = 30% and by pipe Y = 5%

So, in 5 minutes, % of tank filled = 30+5=35%

In 10 minutes, the tank is filled 70%

For next 2 minutes part of tank filled = 5+12 = 17%

The remaining 12% is filled in time = 2 minutes

Total time taken = 10+2+2 = 14 minutes

22. A certain number of people get together to contribute in the construction of a charity hospital. But every month four people step out of this plan. Due to this the task is completed in half more year instead of one year. Then how many people were originally involved in this plan?

Answer:

Let the total number of people = x

Then,

$12x = (x + (x-4) + (x-8) + (x-12) + (x-16) + (x-20) + \dots)$ 18 times

$12x = 18x - 4(1+2+3+\dots+17)$

$6x = (4 \times 17 \times 18) / 2$

$x = 102$

23. Find the percentage by which the volume of the circular cylinder change assuming that the radius and the height of the circular cylinder decreases by 20%?

Answer:

Volume = $\pi r^2 h$

Let the radius and height = 10 cm

So area = $\pi \times 10 \times 10 \times 10 = 1000 \pi \text{ cm}^2$

After decrease

New radius = $10 - 20 \times 10 / 100 = 8 \text{ cm}$

New height = $10 - 20 \times 10 / 100 = 8 \text{ cm}$

New volume = $\pi \times 8 \times 8 \times 8 = 512 \pi \text{ cm}^2$

Decreased volume = $488 \pi \text{ cm}^2$

Percentage decrease = $488 \pi \times 100 / 1000 \pi = 48.8\%$

24. A cyclist, cycling on a road, passes a man who was walking at the rate of 4 km/hr in the same direction. The man could see the cycle for 12 min and it was visible to him up to a distance of 1.2 km. What was the speed of the cycle?

Answer:

Let the speed of cycle be x km/h.

Speed of man = 4 km/h

Relative speed = (x-4) km/h

Therefore, $(x-4) \times 12 / 60 = 1.2$

$x - 4 = 6$

$x = 10 \text{ km/h}$

25. A man can walk up a moving "UP" escalator in 20sec and walk down this moving "UP" escalator in 60sec. Walking speed is same in case of both upwards and downwards. How much time will he take to walk up the escalator, when the escalator is stationary?

Answer:

Assume speed of escalator = x

Speed of man = y

Assume length of escalator = 120

Then $y + x = 120 / 20 = 6$

$y - x = 120 / 60 = 2$

on solving $y = 4, x = 2$

Time taken by man when escalator is stationary = $120 / 4 = 30 \text{ sec}$

26. If a 5 digit number is formed with digits 1,2,3,4 and 5. What is the probability that the number is divisible by 10, if repetition is not allowed.

Answer:

Total numbers = $5! = 120$

For any number to be divisible by 10 the last digit has to be zero, which is not in any case

27. In an election survey, 30% people promised to vote candidate A and remaining promised to vote for candidate B. If on the day of election x% percent of people who promised to vote for A, voted for B and 40% of people who promised to vote B voted against him and in the end B lost by 10 votes. What is value of x, if total 250 votes were casted?

Answer:

$$A = 75 - 20\% \text{ of } (75) + 40\% \text{ of } (175) = 130$$

$$B = 175 + 20\% \text{ of } (75) - 40\% \text{ of } (175) = 120$$

28. If instead of normal weighing scale a shopkeeper uses forged scale. The shopkeeper uses 1.2Kg scale while buying and 800g scale while selling and in the end he offers 10 percent discount, what is his overall profit percentage (approx.)?

Answer:

Let's say the price of 1000g of good = 1000Rs

Now he gets 1200g of good at 1000Rs.

$$\text{Hence CP of shopkeeper for } 1\text{g} = 1000/1200 = 5/6\text{Rs}$$

$$\text{CP of shopkeeper for } 800\text{gram} = 5/6 * 800 = 666.66\text{Rs}$$

Now instead of selling 1000g he sells 800 gram for 900Rs (10% discount)

$$\text{Profit} = 900 - 666.66 / 666.66 * 100 = 35\% \text{ (APPROX)}$$

29. A merchant has 560 kg of wheat which he sells at 10% profit and rest at 18%, overall he gains 15%. The quantity sold at 10% profit is?

Answer:

$$10\% \dots \dots \dots 18$$

$$\dots \dots \dots 15 \dots \dots \dots$$

$$3\% \dots \dots \dots 5$$

$$3/8 * 560 = 210$$

30. When Anil will become as old as his father is now, he will be four times the present age of his son and then his son will be nine years older than what Anil is now. If the sum of his father's age and his age is 80 years old, then how old is Anil now?

Answer:

Let present age of Anil = x years

So age of his father = (80-x) years

Age of Anil's son = (80-x)/4

When Anil will be as old as his father i.e. (80-x) years

So age of Anil's son = (80-x)/4 + (80-x-x)

Now

$$(80-x)/4 + (80-2x) = x + 9$$

This gives age of Anil, x = 28

31. After selling an article, it is found that profit is 20% more than the cost price of article. If the cost price is increased by 10% keeping the selling price same, then what percent of selling price is profit?

Answer:

Let CP = Rs 100, then profit = $20/100 \times 100 = \text{Rs } 20$, and SP = Rs 120

Now New CP = $110/100 \times 100 = \text{Rs } 110$, SP = Rs 120, so profit = $120 - 110 = \text{Rs } 10$

$$\text{Required } \% = 10/120 \times 100 = 25/3 \%$$

32. Two trains which are 150 m long each are moving in opposite directions. They cross each other in 12 seconds. If one train is moving two and a half times as fast the other train, then find the speed of the faster train.

Answer:

Let speed of slower train = x m/s, then speed of faster train = 2.5x m/s

Their relative speed becomes = $x + 2.5x = 3.5x \text{ m/s}$

$$\text{So } (150 + 150)/12 = 3.5x$$

After solving, speed of slower train, x = 50/7 m/s

$$\text{So speed of faster train} = 2.5 \times 50/7 = 125/7 \text{ m/s} = 125/7 \times 18/5 \text{ km/hr}$$

33. Rohit borrowed Rs. 6000 at 5% p.a. simple interest for 2 years. After that he invests it in a scheme which offers 7 1/4% p.a for 2 years. Find the profit of Rohit in the transaction per year.

Answer:

$$\text{Profit in 2 years} = [6000 \times 29/4 \times 2/100 - 6000 \times 5 \times 2/100] = 870 - 600 = \text{Rs } 270$$

$$\text{So profit per year} = 270/2 = \text{Rs } 135$$

34. A man can row at 15 km/hr in still water. If the velocity of current is 9 km/hr and it takes him 3 hours to row to a place and come back, how far is the place?

Answer:

$$\text{Distance} = \text{time} \times [B^2 - R^2] / 2 \times B = 3 \times [15^2 - 9^2] / 2 \times 15 = 14.4 \text{ km}$$

35. Twenty women can complete a work in 12 days and Twenty-four children can complete the same work in 15 days. How many days will thirty women and eighteen children take to complete the work?

Answer:20 w in 12 days, so 30 w in $20 \times 12 / 30 = 8$ days24 c in 15 days, so 18 c in $24 \times 15 / 18 = 20$ daysSo they will complete the work in $20 \times 8 / [20 + 8] = 40/7$ days**36. Can A contains 20% water and rest milk. Can B contains 40% water. How much milk should be taken from both the cans and mix in can C to get 15 litres of milk such that the ratio of water to milk in can C is 3 : 7?****Answer:**Milk in can A is 80% or $80/100 = 4/5$ Milk in can B is 60% or $60/100 = 3/5$ Milk in final can C = $7/(3+7) = 7/10$

So by Alligation method

4/5 3/5

. 7/10

1/10 1/10

which gives 1 : 1

so milk from can A is $1/2 \times 15 = 7.5$ l**37. The curved surface area of a cylindrical pillar is 616 m^2 and its volume is 2156 m^3 . Find the ratio of its diameter to its height.****Answer:** $\pi r^2 h / 2\pi r h = 2156 / 616$ So, radius, $r = 7$ m $2 \times 22/7 \times 7 \times h = 616$ So, height $h = 14$ Ratio: $2r/h = 14/14 = 1/1$ **38. The average age of 10 men increases by 1.5 years when a new person comes in place of one of them whose age is 34 years. What is the age of the new person?****Answer:**Total age increased = $10 \times 1.5 = 15$ yearsSo age of new person = $34 + 15 = 49$ years**39. In a box, there are 6 black, 4 blue and 2 red marbles. One marble is picked up randomly. What is the probability that it is neither black nor red?****Answer:**

Neither black nor red means the ball should be blue

So probability = ${}^4C_1 / {}^{12}C_1 = 4/12 = 1/3$ **40. The average age of Abhilasha and Aadhira is 35 years. If Aaloka replaces Abhilasha, the average age is 31 years, if Aaloka replaces Aadhira average age is 36 years. If the average age of Aditi and Aashirya is half of average age of Abhilasha, Aadhira and Aaloka. then average age of all the five people is****Answer:**

Abhilasha, Aadhira, Aaloka, Aditi, Aashirya – X, Y, Z, P, Q

 $X + Y = 35 \times 2 = 70$ –(1) $Z + Y = 31 \times 2 = 62$ –(2) $X + Z = 36 \times 2 = 72$ –(3)

From (1) (2) and (3)

 $X = 40$; $Y = 30$; $Z = 32$ Average age of P and Q = $1/2 * [(X + Y + Z)/3] = 102/6 = 17$

Sum of the age of P and Q = 34

Average age of all the five people = $(34 + 102)/5 = 27.2$ **41. A bag contains 6 red balls, 11 yellow balls and 5 pink balls. If two balls are drawn at random from the bag, one after another, what is the probability that the first ball is red and the second ball is yellow?****Answer:**Total of balls = $6 + 11 + 5 = 22$ $n(S) = {}^{22}C_2 = (21 \times 22) / 2 = 231$ Now, $n(E) = {}^6C_1 \times {}^{11}C_1 = 6 \times 11 = 66$ $P(E) = n(E)/n(S) = 66/231 = 6/21 = 2/7$ **42. The sum of the radius and the height of a cylinder is 19m. The total surface area of the cylinder is 1672 m^2 , what is the volume of the cylinder? (in m^3)****Answer:**Let the radius of the cylinder be r and height be h .

Then, $r + h = 19$ (i)

Again, total surface area of cylinder = $(2\pi rh + 2\pi r^2)$

Now, $2\pi r(h + r) = 1672$

or, $2\pi r \times 19 = 1672$

or, $38\pi r = 1672$, $\pi r = (1672/38) = 44m$, $r = (44 \times 7) / 22 = 14$

Height = $19 - 14 = 5m$

Volume of cylinder = $\pi r^2 h = (22/7) \times 14 \times 14 \times 5 = 14m \times 22 \times 2 \times 14 \times 5 = 3080m^3$

43. The ratio of the speed of the boat upstream to the speed of the boat downstream is 2 : 3. What is the speed of the boat in still water if it covers 42 km downstream in 2 hours 20 minutes? (in km/h)

Answer:

Let the speed of the boat in still water be x and that of the current be y .

Then, downstream speed = $x + y$ and upstream speed = $x - y$

Now, downstream speed = $42 / [2 \text{ } 20/60] = (42 \times 3) / 7 = 18 \text{ km}$

$x+y=18$

Again, 3 : 18, 2 : 12

(As ratio of downstream to upstream is 2 : 3)

$x - y = 12$ Solving (i) and (ii), we get

$(x+y=18) + (x - y =12) = 2x = 30$

$x = 15 \text{ kmph}$

Hence speed of the boat 15 kmph

44. 35 men complete a piece of work in 16 days and 20 women complete the same piece of work in 30 days. What is the ratio of the amount of work done by 40 men in 1 day to the amount of work done by 15 women in 1 day?

Answer:

35 men complete the work in 16 days.

1 man completes the work in 16×35 days,

32 men complete the work in $(16 \times 35)/40 = 14$ days.

Again, 20 women complete the same piece of work in 30 days.

1 woman completes the same piece of work in 20×30 days.

15 women can complete the work in $(20 \times 30)/15 = 40$ days.

Ratio = $1/14 : 1/40 = 40 : 14 = 20 : 7$

45. A man sold an article for Rs. 6800 and incurred a loss. Had he sold the article for Rs.7850, his gain would have been equal to half of the amount of loss that he incurred. At what price should he sell the article to have 20% profit?

Answer:

Let the cost price be x .

Then, loss = $(x - 6800)$

Again, profit = $(7850 - x)$

Now, $(7850 - x) = (x - 6800)/2$ or, $15700 - 2x = x - 6800$

or, $3x = 15700 + 6800 = 22500 \Rightarrow x = 22500/3 = 7500$

Selling price = $(7500 \times 120)/100 = \text{Rs. } 9000$

46. A bought a certain quantity of bananas at a total cost of Rs. 1500. He sold 1/3 of these bananas at 25% loss. If he earns an overall profit of 10%, at what percentage profit did A sell the rest of the bananas?

Answer:

Total CP = 1500

Total SP = $1500 + 10\% \text{ of } 1500 = 1500 + 150 = 1650$

CP of 1/3 of bananas = $1500/3 = \text{Rs. } 500$

SP of 1/3 of bananas at 25% loss

= $500 - [(500 \times 25) / 100] = 500 - 125 = 375$

SP of the rest of bananas = $1650 - 375 = 1275$

Now, CP of the rest of bananas = $1500 - 500 = 1000$

Profit on the rest of bananas = $1275 - 1000 = 275$

% of profit on the rest of bananas = $(275/1000) \times 100 = 27.5\%$

47. A tank has two inlets: P and Q. P alone takes 6 hours and Q alone takes 8 hours to fill the empty tank completely when there is no leakage. A leakage was caused which would empty the full tank completely in 'X' hours when no inlet is open. Now, when only inlet P was opened, it took 15 hours to fill the empty tank completely. How much time will Q alone take to fill the empty tank completely? (in hours)

Answer:

$$(1/P) - (1/X) = (1/15)$$

$$\text{Or, } (1/6) - (1/X) = (1/15) \text{ (P = 6 hours)}$$

$$\text{Or, } (1/X) = (1/6) - (1/15) = (10-4)/60 = 1/10$$

x = 10 hours

Now,

$$(1/Q) - (1/10) = (1/8) - (1/10) = (5-4)/40 = 1/40$$

Hence, Q fills the tank in 40 hours.

48. At present, the ratio of the ages of A to B is 3 : 8; and that of A to C is 1 : 4. Three years ago, the sum of the ages of A, B and C was 83 years.

What is the present age (in years) of C?

Answer:

According to the question, A : B = 3 : 8

A : C = 1 : 4

B : A = 8 : 3

A : C = 1 : 4

8 : 3 : 12

$$\text{Sum} = 8x + 3x + 12x = 23x$$

$$\text{Now, } 23x = 92$$

$$x = 4$$

Hence the present age of C = 12x = 12 x 4 = 48 years

49. The sum invested in Scheme B is thrice the sum invested in Scheme A. The investment in Scheme A is made for 4 years at 8% p.a. simple interest and in Scheme B for 2 years at 13% p.a. simple interest. The total interest earned from both the schemes is Rs.1320. How much amount was invested?

Answer:

Let the amount invested in scheme A be Rs.x and that in B be Rs. 3x.

$$\text{Then, } [(x \times 4 \times 8)/100] + [(3x \times 2 \times 13) /100] = 1320$$

$$\text{Or, } (32x/100) + (78x/100) = 1320$$

$$110x/100 = 1320$$

$$x = (1320 \times 100) / 110 = \text{Rs. } 1200$$

50. Kim and Om are travelling from point A to B, Which are 400 km apart. Travelling at a certain speed Kim takes one hour more than Om to reach point B. If Kim doubles her speed she will take 1 hour 30 mins less than Om to reach point B. At what speed was Kim Driving from point A to B? (in kmph)

Answer:

Let the speed of Kim be x and that of Om be y.

$$\text{Then, } (400/x) - (400/y) = 1$$

Let $1/x = u$ and $1/y = v$

$$400u - 400v = 1 \quad \dots(i)$$

$$\text{Again, } (400/y) - (400/2y) = 3/2$$

$$400v - 200u = (3/2)$$

$$\text{Or, } 800v - 400u = 3 \quad \dots(ii)$$

Solving (i) and (ii), we get

$$(400u - 400v = 1) + (-400u + 800v) = 400v = 4$$

$$v = (4/400) = (1/100) \text{ km}$$

$$y = 100 \text{ km}$$

$$\text{now, } (400/x) - (400/100) = 1$$

$$\text{or, } (400/x) = 5$$

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

51. Find the number of words formed with the letters of the word 'BOOKS' beginning with B and ending with S.

Answer:

We have to arrange 3 letters (O, O and K) out of which 'O' occurs two times. So, reqd no. = $3! / 2! = 3$ ways

52. A box contains 5 Sony, 6 Samsung and 4 Sandisk pen drives. 3 pen drives are drawn at random. What is the probability that they are not of the same company?

Answer:

The total number of pen drives = 5 + 6 + 4 = 15

$$n(S) = {}^{15}C_3 = (15 \times 14 \times 13) / (3 \times 2) = 455$$

Now, 3 pen drives out of 15 pen drives can be drawn in 455 ways.

If all 3 pen drives are of the same company

It Can be done in $5C3 + 6C3 + 4C3 = 10 + 20 + 4 = 34$ ways

Probability that all 3 pen drives are not of the same company = $1 - (34/455) = (421/455)$

53. The base of a triangular field is 660 metres and height 440 metres. If the charges for watering the field are at the rate of Rs.26.5 per sq hectometre, find the total cost to water the triangular field.

Answer:

Area of the field = $(\text{Base} \times \text{Height}) / 2 = (660 \times 440)/2$ sq metre = $(660 \times 440)/(2 \times 100 \times 100)$ sq metre = 14.52 sq hectometres

Cost of watering 1 sq hectometre = Rs.26.5

Cost of watering the field = $26.5 \times 14.52 = \text{Rs.}384.78$

54. In a mixture of milk and water the proportion of milk by weight was 70%. If in a 250-gm mixture 100 gm water was added, what would be the percentage of water?

Answer:

Proportion of milk in the mixture = $250 \times (70/100) = 175\text{gm}$

Water = 75 gm

After 100 gm water added in mixture the percentage of water = $(75 + 100) / (250 + 100) \times 100 = (175/350) \times 100 = 50\%$

55. Two pipes can fill a tank in 28 and 24 minutes respectively and a waste pipe can empty 5 gallons per minute. All three pipes working together can fill the tank in 16 minutes. How much time is taken by the waste pipe to empty the full tank?

Answer:

Let the capacity of the tank be 336 litres

LCM of (28, 24 and 16 = 336)

Waste pipe empties the tank in $(12 + 14 - 21) \times 5$ litres per minute

Waste pipe empties the tank in $(336/5) = 67.2$ minutes

56. The average score of a cricket player after 24 innings is 25 and in the 25th innings the player scores 25 runs. In the 26th innings what minimum number of runs will be required to increase his average score by 2 than it was before the 26th innings?

Answer:

The average score of a cricket player after 25th Innings = $(24 \times 25 + 25) / 25 = 25$

Required Run = X

$(625 + X)/26 = 27$

$X = 26 \times 27 - 625 = 77$

57. There are two vessels P and Q filled with cooking oil with different prices and with volumes 160 and 40 liters respectively. Equal quantities are drawn from both P and Q in such a manner that the cooking oil drawn from P is poured in into Q and oil drawn from Q is poured into P. If the price per liter becomes equal in both vessels. What is the (equal) quantity that was drawn from both P and Q?

Answer:

Vessel (P)	Vessel (Q)
------------	------------

Quantity= 160 l	Quantity= 40 l
-----------------	----------------

rate – p	rate – q
----------	----------

Let quantity taken out from both = a litres

'a' litres removed from p and 'a' litres added from q

So rate of vessel P after removal and then addition = $[(160-a)p + aq]/160$

Similarly rate of vessel Q after removal and then addition = $[(40-a)q + ap]/40$

Now equate these equations

$[(160-a)p + aq]/160 = [(40-a)q + ap]/40$

Solving, we get a = 32 l

58. A book seller sold a book at Rs. 56 in such a way that his percentage profit is same as the cost price of the book. If he sells it at twice the percentage profit of its previous percentage profit then new selling price will be?

Answer:

CP = x

SP = $x + (x \times x)/100 = 56$

$x^2 + 100x - 5600 = 0$

x = 40

SP = $40 + (40 \times 80)/100 = \text{Rs. } 72$

59. A circular road runs round a circular playground. If the difference between the circumferences of the outer circle and the inner circle is 132 metres, then what is the width of the road?

Answer:

Width of the Road = R – r

$2\pi R - 2\pi r = 132$

$R - r = 132 \times (7/44) = 21 \text{ m}$

60. There are two concentric circles whose areas are in the ratio of 16:25 and the difference between their diameters is 8 m. Find out the area of the inner circle?

Answer:

$$r^2/R^2 = 25/16 \Rightarrow r/R = 5/4$$

$$5x - 4x = 4$$

$$x = 4$$

Inner Radius = 16m

$$\text{Area of Inner Circle} = \pi (16 * 16) = 256\pi \text{m}^2$$

61. Two-thirds of a commodity was sold at a profit of 5% and the remainder at a loss of 2%. If the total profit was Rs.400, what was the cost of the commodity?

Answer:

let the cost of commodity be Rs.x

$$\text{Then, } (2x/3) \times 1.05 + (1x/3) \times 0.98 = x + 400$$

$$\text{Or, } (1/3) \times (3.08) = x + 400$$

$$\text{Or, } 0.8x = 400 \times 3$$

$$\text{Or, } (1200 / 0.08) = (120000 / 8)$$

$$x = \text{Rs.15000}$$

62. A car covers a distance between A and B in 45 minutes. If the speed of the car is reduced by 8 km per hour then the same distance is covered in 49.5 minutes. What is the distance between A and B?

Answer:

Let the distance between A and B be d km

$$\text{Then, } [d/(45/60)] - [d / (49.5/60)] = 8$$

$$\text{Or, } 4d/3 - 120d / 99 = 8$$

$$\text{Or, } (132d - 120d) / 99 = 8$$

$$D = (8 \times 99) / 12 = 66 \text{ km}$$

63. If the difference between the simple interest and the compound interest earned on a certain amount @ 12% at the end of 3 years is Rs.336.96, then what is the amount?

Answer:

$$D = \text{Rs. } 336.96$$

$$T = 3 \text{ years}$$

$$R = 12\%$$

$$P = \text{Difference} \times (100)^3 / r^2 (300 + r) = (336.96 \times 1000000) / [144(300+12)] = 336960000/44928 = \text{Rs. } 7500$$

64. A race track is in the form of a ring whose inner circumference is 396m and outer circumference is 418m. Find the width of the track.

Answer:

$$\text{Circumference of outer track } 418 \text{ } 2\pi R = 418$$

$$R = (418 \times 7) / 44 = 66.5$$

$$\text{Circumference of inner track} = 396 \text{ } 2\pi r = 396$$

$$r = (396 \times 7) / 44 = 63$$

$$\text{width of the track} = 66.5 - 63 = 3.5\text{m}$$

Note: instead of calculating in two parts perform a single calculation like

$$\text{Width} = R - r = 7/44 (418 - 396) = (7/44) \times 22 = 3.5\text{m}$$

65. The average age of Ram, Shyam and Ghanshyam is 26years. 3 year ago, average age of Ram and Shyam was 21yrs. 4 years hence the average age of Shyam and Ghanshyam will be 28 years. Find the present age of Shyam?

Answer:

$$\text{average age of all three} = 26$$

$$\therefore \text{total age of all three} = 26 \times 3 = 78$$

$$3\text{yrs ago, average age of Ram and Shyam} = 21$$

$$3\text{yrs ago, total age of Ram and Shyam} = 21 \times 2 = 42$$

$$\therefore \text{present total age of Ram and Shyam} = 42 + 6 = 48$$

$$\therefore \text{present age of Ghanshyam} = 78 - 48 = 30$$

Similarly present age of Ram = 30

$$\text{hence, Present age of shyam is} = 78 - 30 - 30 = 18 \text{ years}$$

66. If another guy Danpat joins in who is 2 year younger than Esha and the average of Esha and Raman was 27, two years ago. Also it is given that average of Raman and Ram 4 year hence will be 25. So what is average of present age of Danpat, Raman and Esha?

Answer:

Ram age 4 year hence will be 34
 Average of Ram and Raman 4 year hence=25
 Total age of Ram and Raman 4 year hence=50
 Therefore Raman age 4 year hence will be=16
 Raman present age=12
 Raman age 2 year ago=10
 Therefore esha age 2 year ago was=54-10=44
 Esha current age=46
 Danpat current age=44
 Average of all three=(46+44+12)/3=34

67. 36 women can do a work in X days and 30 men can do the same work in (X - 4) days. The ratio of work done by 10 men and 12 women in the same time is 2:1. What is the value of X?

Answer:

$$M_1D_1T_1/W_1 = M_2D_2T_2/W_2 \quad [\text{men}_1 * \text{day}_1 * \text{time}_1 / \text{work}_1 = \text{men}_2 * \text{day}_2 * \text{time}_2 / \text{work}_2]$$

$$10M/2 = 12W/1$$

$$5M = 12W \dots\dots\dots(i)$$

$$\text{Also } 36W * X = 30M * (X - 4)$$

From (i)

$$15M * X = 30M * (X - 4)$$

$$X = 8$$

68. A boat travelling at a speed of 60 kmph started at 3 p.m. when there was no current from point X for point Y which is 240 km apart. After some amount of time current started which delayed the entire journey by 15 minutes. Find the time at which current started if the speed of boat is 6 times to the speed of current?

Answer:

As time is increased boat will be travelling against the current

$$t_1 + t_2 = 17/4 \quad [t_1 = \text{time till no current}, t_2 = \text{time after current}]$$

$$60t_1 + 50t_2 = 240$$

On solving $t_1 = 11/4$ hour

Hence current started at $3 + 11/4 = 5:45$ p.m

69. A boat takes 58 hours for travelling downstream from Point X to point Y and coming back to point Z midway between X and Y. If the speed of the stream is 4 kmph and speed of the boat in still water is 11 kmph, then what is the distance between X and Y?

Answer:

$$\text{Speed downstream} = 11 + 4 = 15 \text{ kmph.}$$

$$\text{Speed upstream} = 11 - 4 = 7 \text{ kmph.}$$

Let distance between P and Q be 'x' km, then,

$$x/15 + (x/2)/7 = 58.$$

$$\text{i.e., } x/15 + x/14 = 58.$$

Solving we get, $x = 420$ km.

70. A boat takes 4 hours more while going back in upstream than in downstream when the distance between two places is 32 km and the speed of boat in still water is 6kmph. What must be the speed of boat in still water so that it can row downstream, 32km in 4 hours?

Answer:

$$32/(6-R) - 32/(6+R) = 4$$

$$R = 2 \text{ kmph}$$

$$(B + 2) = 32/4$$

Speed of boat in still water = 6kmph

71. A milkman mixes 20 lites of water with 80 litres of milk. After selling one-fourth of this mixture, he adds water to replenish the quantity that he has sold. What is the current proportion of water to milk ?

Answer:

1/4th of the mixture is sold

1/4th of milk and 1/4th of water is sold.

= 3/4th of milk = $(3/4) \times 80 = 60$ litres of milk is remaining and rest part $100 - 60 = 40$ litres is water (as water is added in place of milk)

Reqd ratio = 40 : 60 = 2 : 3

72. Ajay and Bala invest Rs. 4000 and Rs. 5000 in a business. Ajay receives Rs. 20 per month out of the profit as remuneration for running the business and the rest of profit is divided in proportion to the investment. In a year Ajay totally receives Rs. 672. What does Bala receives?

Answer:

Annual profit = x

Ratio of profit share between Ajay and Bala = 4 : 5

Ajay gets: $20 * 12 + 4/9 * x = 672$

Solving, we get, $x = 108 * 9$

So Bala gets = $5/9 * x = 5/9 * 108 * 9 = \text{Rs } 540$

73. Angel, Beaula and Catherine entered into a partnership in a business. Angel got 5/7 of the profit. Beaula and Catherine distributed the remaining profit equally. If Catherine got Rs.500 less than Angel, then the total profit was?

Answer:

Total Profit = x

Angel's Share = $(5x/7)$

Remaining Profit = $x - (5x/7) = (2x/7)$

Beaula and Catherine distributed the remaining profit equally- $x/7, x/7$

$(5x/7) - (1x/7) = 500$

$(4x/7) = 500$

$x = 500 * (7/4) = 875$

74. A shopkeeper buys an article at a discount of 20% on the listed price from a wholesaler. The shopkeeper marks up the price by 15% on the listed price. A buyer pays Rs.3795 to get it after paying sales tax at the rate of 10% on the price asked for. Find the profit percentage of the shopkeeper.

Answer:

Let the listed price = Rs. 100

CP of shopkeeper = $100 - 20 = \text{Rs. } 80$

Marked price by shop keeper = $100 + 15 = \text{Rs. } 115$

Now, $115 = 3795 * (100/110) = 3450$

$80 = (3450/115) * 80 = \text{Rs. } 2400$

CP of shopkeeper = Rs. 2400

Profit = $3450 - 2400 = 1050$

Profit % = $(1050 / 2400) * 100 = 43.75\%$

75. A sum amounts to Rs.10580 in 2 years and to Rs.12167 in 3 years compounded annually. Find the sum and the rate of interest per annum.

Answer:

$12167 = 10580 [1 + (r/100)]^3$

Or, $(12167/10580) = 1 + (r/100)$

Or, $(12167/10580) - 1 = r/100$

$r = (12167 - 10580) / 10580 * 100 = 15\%$

sum = $(10580 * 100 * 100) / (115 * 115) = \text{Rs. } 8000$

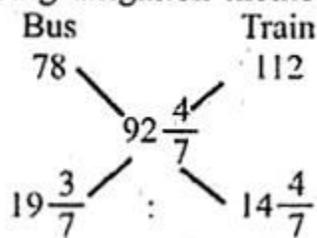
Sum = Rs. 8000, Rate = 15%

76. Mohit travels 972 km in 10.5 hours in two stages. In the first part of the journey, he travels by bus at the speed of 78 km, per hour. In the second part of the journey, he travels by train at the speed of 112 km/hr. How much distance does he travel by train?

Answer:

We use only alligation on speed (km/hr) to get ratio of time spent in bus and train. overall speed = $(972/10.5) = (1944/21) = 648/7$

Using alligation method



$136/7 : 102/7 \rightarrow 136 : 102$

Or 4 : 3

Time spent in train = $10.5 (3/7) = 4.5$ hours

Distance travelled by train = $112 * 4.5$ hours = 504 km

77. A contractor undertook to do a certain work in 75 days and employed 48 men to do it. After 55 days he found that only (2/3) of the work was done. How many more men must be employed so that the work may be finished in time?

Answer:

Apply $M_1 D_1 / W_1 = M_2 D_2 / W_2$

Or, $(48 * 55) / (2/3) = (M * 20) / (1/3)$

$M = 66$ men

Reqd more men = $66 - 48 = 18$ men

78. 49 pumps can empty a reservoir in 17/2 days working 6 hours a day. If 119 pumps are used for 7 hours a day then in how many days will the same work be completed?

Answer:

Let the required number of days be x .

$$49 \times (17/2) \times 6 = 119 \times 7 \times x$$

$$x = 3 \text{ days}$$

79. 6 kg of an alloy A is mixed with 8 kg of alloy B. If alloy A has lead and tin the ratio 1 : 3 and B has tin and copper in the ratio 2 : 3, then what is the amount of tin in the new alloy?

Answer:

$$\text{Quantity of tin in alloy A} = 6 \times (3/4) = 4.5 \text{ kg}$$

$$\text{Quantity of tin in alloy B} = 8 \times (2/5) = 3.2 \text{ kg}$$

$$\text{Quantity of tin in the new alloy} = 4.5 + 3.2 = 7.7 \text{ kg}$$

80. There are 5 boys and 4 girls. In how many ways can they be seated in a row so that all the girls do not sit together?

Answer:

$$\text{Total number of persons} = 5 + 4 = 9$$

When there is no restriction they can be seated in a row in $9!$ Ways. But if all the 4 girls sit together, we can consider the group of 4 girls as one person. Therefore, we have only $5 + 1 = 6$ persons

$$\text{Number of ways} = 6! \text{ Ways}$$

$$\text{But 4 girls can be arranged among themselves in } 4! \text{ Ways}$$

$$\text{Reqd no. of ways in which all the 4 girls do not sit together} = 9! - 6! \times 4!$$

$$= 9 \times 8 \times 7 \times 6! - 6! \times 24 = 6! (504 - 24) = 720 \times 480 = 720 \times 480 = 345600$$

Directions (81 – 85) Study the following passage and answer the questions accordingly.

Five members of a family live in Mumbai namely A, B, C, D and E. A and B together can do a piece of work in 80 days. B and C together can do a piece of work in 60 days. C and D together can do a piece of work in 40 days. D and E together can do a piece of work in 20 days. A alone can do a piece of work in 120 days.

81. If A, B and C together can do a piece of work in 'x' days then how much work could be done in the same days when E do the same work?

Answer:

According to question,

$$(A+B+C)'s \text{ one day work} = 1/120 + 1/240 + 1/80 = (2+1+3)/240 = 6/240 = 1/40$$

Required Answer, E alone works to finish,

$$E = (1/40) / (3/80) = 1/40 \times (80/3) = 2/3 \text{ of the work}$$

82. B, C and D can complete a piece of work in 'x' days. If all of them work together and after three days B left and the remaining work be completed by C and D with help of E. In how many days can C, D and E do the remaining work?

Answer:

$$(B+C+D)'s \text{ one days work} = 1/240 + 1/80 + 1/80 = 7/240$$

According to question,

$$(B+C+D)'s \text{ three days work} = 7/240 \times 3 = 7/80$$

$$\text{Then, remaining work,} = 1 - 7/80 = 73/80$$

Required answer is,

$$(73/80) / (1/80 + 1/80 + 3/80) = 73/80 \times 80/5 = 73/5 = 14 \frac{3}{5} \text{ days}$$

83. A, C and D can do a piece of work in x, y and z days, respectively. They work alternately in a way that first day A, second day C and third day D, fourth day A and so on. How many days will be needed to complete the work in this way?

Answer:

$$A's \text{ one day work} = 1/120;$$

$$C's \text{ one day work} = 1/80;$$

$$D's \text{ one day work} = 1/80$$

According to question,

$$\text{work done in first 3 days} = 1/120 + 1/80 + 1/80 = (2+3+3)/240 = 8/240 = 1/30$$

$$\text{Time taken to complete } 1/30 \text{ part of work} = 30 \text{ days}$$

$$\text{Required Answer, (Time taken to complete the whole work)} = 3 \times 30 = 90 \text{ days}$$

84. A, B and C can do a piece of work in 'x' days, 'y' days and 'z' days respectively. As they were ill, they could do 90%, 75% and 80% of their efficiency, respectively. How many days will they take to do the work together?

Answer:

According to question,

$$A's \text{ one day work} = 90\% \text{ of } 1/120 = 90/100 \times 1/120 = 3/400$$

$$B's \text{ one day work} = 75\% \text{ of } 1/240 = 75/100 \times 1/240 = 1/320$$

$$C's \text{ one day work} = 80\% \text{ of } 1/80 = 80/100 \times 1/80 = 1/100$$

$(A+B+C)$'s one day's work $= \frac{3}{400} + \frac{1}{320} + \frac{1}{100} = \frac{(12+5+16)}{1600} = \frac{33}{1600}$

Hence, time taken by them to complete the work $= \frac{1600}{33} = 48 \frac{16}{33}$

85. C can do $\frac{1}{4}$ of a work in 80 days, D can do 40% of the same work in 80 days and E can do $\frac{1}{3}$ of a work in $\frac{800}{3}$ days. Who will complete the work first?

Answer:

Time taken to complete the work by C $= 80 \times 4 = 320$ days

Time taken to complete the work by

D $= 80 \times \frac{100}{40} = 200$ days

Time taken to complete the work by E $= \frac{800}{3} \times 3 = 800$ days

86. A box contains 6 black and 14 white balls, out of which 3 black and 5 white balls are defective. If we choose two balls at random, what is the probability that either both are white or both are non-defective?

Answer:

Required probability $= \frac{{}^{14}C_2}{{}^{20}C_2} + \frac{{}^{12}C_2}{{}^{20}C_2} - \frac{{}^9C_2}{{}^{20}C_2} = \frac{121}{190}$

87. In a class, the average age of some boys is 16 years, and average age of 16 teachers is 56 years. If the average age of the combined group of all the teachers and boys is 20, then the number of students is

Answer:

Use allegation method

number of boys 'x' : number of teacher '16'

. 16 : 56

. : 20

. $(56-20)=36$: $(20-16)=4$

. So $\frac{36}{4} = \frac{x}{16}$

Now, $\frac{x}{16} = \frac{9}{1}$, $x=144$

88. If the CI on a certain sum for 2 yrs at 10% per annum is Rs. 3150, what would be the SI on same rate for same time?

Answer:

Let principal = Rs x

CI for 2 years in % = 21% (using successive method)

21% of x = 3150

x = 15000

S.I = $15000 \times 2 \times \frac{10}{100} = \text{Rs. } 3000$

89. A started a business with initial investment of rs.12000, after 3 month B invest rs.15000 in this business. After 8 month from starting A withdrew one-fourth of his investment and B further invest $\frac{1}{15}$ part of his investment. If at the end of one year the difference between the shares of profit of both is 700, what is the B's profit share?

Answer:

$(12000 \times 8 + 9000 \times 4) : (15000 \times 5 + 16000 \times 4)$

132 : 139

Difference in profit sharing ration is $= 139x - 132x = 7x$

Given $7x = 700$, So $x = 100$

B's profit share = $139x = 13900$

90. There are three taps A, B, and C. A takes thrice as much time as B and C together to fill the tank. B takes twice as much time as A and C to fill the tank. In how much time can the Tap C fill the tank individually, if they would require 10 hours to fill the tank, when opened simultaneously?

Answer:

Let A, B, C fills a, b, c units per hour.

Total units = $10 \times (a+b+c)$

Now, $3a = b+c$ and $2b = a+c$

Solving both,

$b = \frac{4c}{5}$ and $a = \frac{3c}{5}$

total units of work = $10c \times (\frac{4}{5} + \frac{3}{5} + 1) = 24c$

done by C in $\frac{24c}{c} = 24$ hours

91. Mano prepares a budget to visit London. However, he spends 12% of his budget on the first 10% days of his travel when he stays in the city. He knows that he has to spend another 35% of days in city itself, after which he would travel to the country side. What should be the minimum decrease in spending in country side as a percentage of his spending in city so as to complete his travel on the initial budget itself?

Answer:

Budget spends on 10% of days = 12%

$$\text{so, in 1\% of days} = \frac{12}{10}$$

$$35\% \text{ remaining days in city} = \frac{12}{10} \times 35 = 42\%$$

$$\text{Overall budget spent on 45\% of days in city} = \frac{12}{10} \times 45 = 54\%$$

Days remaining = 55%, Budget remaining = 46%

In 1% of day remaining, he can spend = $\frac{46}{55}$ of budget

$$\text{Therefore, \% decrease required} = \frac{\frac{12}{10} - \frac{46}{55}}{\frac{12}{10}} \times 100 = 30.3\%$$

92. A merchant can buy goods at the rate of Rs.20 per good. The particular good is part of an overall collection and the value is linked to the number of items that are already on the market. So, the merchant sells the first good for Rs.2, second one for Rs.4, third for Rs.6... and so on. If he wants to make an overall profit of at least 40%, what is the minimum number of goods he should sell?

Answer:

Let us assume he buys n goods.

$$\text{Total CP} = 20n$$

$$\text{Total SP} = 2 + 4 + 6 + \dots n \text{ terms}$$

Total SP should be at least 40% more than total CP

$$2 + 4 + 6 + 8 + \dots n \text{ terms} \geq 1.4 \times 20n$$

$$2(1 + 2 + 3 + \dots n \text{ terms}) \geq 28n$$

$$n(n + 1) \geq 28n$$

$$n^2 - n \geq 28n$$

$$n^2 - 27n \geq 0$$

$$n \geq 27$$

He should sell a minimum of 27 goods.

93. A train meets with a minor accident after travelling 100 km from starting point A and then proceeding at a reduced speed of three-fourth of original speed arrives at its destination B 90 minutes late. Had the accident occurred 60 kms further on, the train would have reached the destination 15 minutes earlier. The original speed of the train and distance AB are.

Answer:

Original speed is,

$$\frac{60}{\frac{3}{4} \times S} = \frac{60}{S} + \frac{15}{60}$$

$$\frac{80}{S} - \frac{60}{S} = \frac{1}{4}$$

$$S = 80 \text{ km per hr}$$

Total distance is,

$$\frac{x}{60} - \frac{x}{80} = \frac{90}{60}$$

$$x \left(\frac{1}{3} - \frac{1}{4} \right) = 30$$

$$x \left(\frac{1}{12} \right) = 30$$

$$x = 360$$

$$\text{Total distance AB} = 100 + 360 = 460 \text{ km}$$

94. Pratap borrowed a sum of money from Arun at simple interest, at the rate of 12% per annum for the first three years, 16% per annum for the next five years and 20% per annum for the period beyond eight years. If at the end of 11 years, the total interest is Rs.6080 more than the sum, the sum borrowed was:

Answer:

Let the sum be borrowed = Rs.100

Then total interest = $12 \times 3 + 16 \times 5 + 20 \times (11 - 8)$

= $36 + 80 + 60 = \text{Rs.}176$

Difference = $176 - 100 = 76$

$\therefore \text{Principal} = \frac{100}{76} \times 6080 = \text{Rs.}8000$

95. A man buys a scooter on making cash down payment of Rs.16224 and promises to pay two more yearly installments of equivalent amounts at the end of first year and second year. If the rate of interest is 4% per annum, compounded annually, the cash value of the scooter is:

Answer:

Cash down payment = Rs.16224

$$1 + \frac{r}{100} = 1 + \frac{4}{100} = \frac{26}{25}$$

$$\therefore \text{Principal of the 1st instalment} = \frac{16224}{\frac{26}{25}}$$

$$= 16224 \times \frac{25}{26} = \text{Rs.}15600$$

$$\therefore \text{Principal of the second instalment} = \frac{16224}{\left(\frac{26}{25}\right)^2}$$

$$= 15600 \times \frac{25}{26} = 15000$$

$$\therefore \text{Principal of the scooter} = \text{Rs.}(16224 + 15600 + 15000) = \text{Rs.}46824$$

96. A student scored 23% of maximum marks and failed by 23 marks. But if he scores 43% of the marks in the same exam, he passes by 17 marks. What is the maximum marks of the exam?

Answer:

Let, maximum marks = x

$$(43-23)\% \text{ of } x = (23+17)$$

$$20\% \text{ of } x = 40$$

Solving we get, x= 200

97. If the price of sugar is increased by 20%, its expenditure gets decreased by 25%. What is the net effect on the total sale?

Answer:

Use successive method

$$20 + (-25) + (20)(-25)/100 = -10$$

98. A invested Rs.50000 for starting a venture and B joined his business with a capital of 65000 after 4 months. A get Rs.350 in every 2 months for his extra work. Find B's profit if A receives a total of Rs.62100 as his share.

Answer:

$$(50000 \times 12) : (65000 \times 8)$$

$$15 : 13$$

$$\text{Now, } (62100 - 350 \times 6) = 60000$$

$$\text{B's profit} = 60000 \times \frac{13}{15} = 52000$$

OR

Let after cutting 350×6 from A's profit, remaining amount is x. So

$$\frac{15}{28} \times x + 350 \times 6 = 62100$$

$$\text{So total } x = 112000$$

$$\text{So B's profit} = \frac{13}{28} \times 112000 = 52000$$

99. Two trains having equal speed take 10 seconds and 15 seconds respectively to cross a 250 meter long bridge. If the length of second train is 150 meters more than the first train, then find the speed of the trains?

Answer:

Let, length of first train = x

$$(x + 250)/10 = (x + 150 + 250)/15$$

Solving, we get x=50

$$\text{Speed} = 300/10 \text{ or } 450/15 = 30\text{m/s}$$

$$\text{Convert this speed into km/h, } 30 \times \frac{18}{5} = 108\text{km/h}$$

100. Thirteen litres are drawn from a cask full of water and then it is filled with milk. Now thirteen litres of mixture are drawn and the cask is again filled with milk. The ratio of quantity of water now left in the cask to that of the milk in it is 16 : 9. How much does the cask hold?

Answer:

Water = 16

Total mixture = 16+9 = 25

$\sqrt{16/25} = 4/5$

Difference in ratio= 1

And this 1 is equal to 13. So total mixture is $13 \times 5 = 65$

OR

Let x litres is total capacity of cask

Using formula, amount of water left in cask = $x [1 - 13/x]^2$

$[1 - 13/x]^2/x = 16/(16+9)$

Solving we get, $x = 65$ l

101. Raman Publishers buys a machine for Rs.50000. The rate of depreciation is 10%. Find the depreciated value of the machine after 4 years. What is the average rate of depreciation?

Answer:

$$\text{Hence machine value after 4 years} = P \left(1 - \frac{R}{100} \right)^4$$

$$\therefore 50000 \left(1 - \frac{10}{100} \right)^4 = 50000 \times \frac{90}{100} \times \frac{90}{100} \times \frac{90}{100} \times \frac{90}{100} = 32805$$

$$\text{Amount of depreciation in four years} = \text{Rs. } (50000 - 32805) = 17195$$

Average rate of depreciation in four years,

$$\therefore \frac{17195}{50000} \times \frac{100}{4} = 8.59 \approx 8.6$$

102. A bank offers 10% interest rate compounded annually. A person deposits Rs.20,000 every year in his account. If he does not withdraw any amount, then how much balance will his account show after four years?

Answer:

According to the question,

$$20000 \text{ after 1st year} = 20000 \left(1 + \frac{10}{100} \right) = 20000 \times \frac{11}{10} = 22000$$

$$20000 \text{ after 2nd year} = 20000 \left(1 + \frac{10}{100} \right)^2 = 20000 \times \frac{11}{10} \times \frac{11}{10} = 24200$$

$$20000 \text{ after 3rd year} = 20000 \left(1 + \frac{10}{100} \right)^3 = 20000 \times \frac{11}{10} \times \frac{11}{10} \times \frac{11}{10} = 26620$$

$$20000 \text{ after 4th year} = 20000 \left(1 + \frac{10}{100} \right)^4 = 20000 \times \frac{11}{10} \times \frac{11}{10} \times \frac{11}{10} \times \frac{11}{10} = 29282$$

$$\text{Total amount after 4 years} = 22000 + 24200 + 26620 + 29282 = 102102$$

103. David invests Rs.7956 in the bank X and Y, so that X's amount at the end of 5 years is equal to Y's amount at the end of 7 years at 10 percent compounded annually. Find the amount invested by David in bank Y.

Answer:

X 's amount after 5 years = Y 's amount after 7 years

$$P_1 \left(1 + \frac{10}{100}\right)^5 = P_2 \left(1 + \frac{10}{100}\right)^7$$

$$\frac{P_1}{P_2} = \frac{\left(1 + \frac{10}{100}\right)^7}{\left(1 + \frac{10}{100}\right)^5} = \left(1 + \frac{10}{100}\right)^{7-5} = \left(1 + \frac{10}{100}\right)^2 = \frac{121}{100}$$

Amount invested by David in bank Y = $7956 \times \left(\frac{100}{121+100}\right) = \text{Rs. } 3600$

104. Messy borrows a certain sum from David at a certain rate of SI for 3 years. She lends this sum to Malar at the same rate of interest but compounded annually for the same period, that is 3 years. At the end of 3 years, she receives Rs.3300 as compound interest, but paid Rs.3000 as simple interest. What is the rate of interest? (Approximately)

Answer:

According to the question,

$$\text{Rate of interest} = \frac{3300 - 3000}{3000} \times 100 \times 2$$

$$\therefore \frac{300 \times 100 \times 2}{3000} = 20$$

Answer = c i.e. 20

105. The simple interest on a certain sum of money for 4 years at 10% per annum is half the compound interest on Rs.24000 for 2 years at 25% per annum. The sum placed on simple interest is

Answer:

$$CI = \left[24000 \left(1 + \frac{25}{100}\right)^2 - 24000\right] = 24000 \times \frac{5}{4} \times \frac{5}{4} - 24000 = 37500 - 24000 = \text{Rs. } 13500$$

$$\sum \therefore \frac{\left(\text{Rs. } \left(\frac{13500}{2}\right) \times 100\right)}{10 \times 4} = \text{Rs. } 16875$$

Answer = d i.e. 16875

106. If compound interest on a sum for 4 years at 12% per annum is Rs.448062, then simple interest on the same sum at the same rate of interest and for the same period of time is?

Answer:

Let the sum be Rs. P .

$$\left[P \left(1 + \frac{12}{100}\right)^4 - P\right] = 448062$$

$$P \left[\left(\frac{28}{25}\right)^4 - 1\right] = 448062$$

$$P(614656 - 390625) = (390625 \times 448062)$$

$$P = \frac{390625 \times 448062}{224301} = 780310$$

$$SI = \frac{780310 \times 12 \times 4}{100} = \text{Rs. } 374549$$

107. What is the difference between compound interests on Rs.20,000 for 1.5 years at 10% per annum compounded yearly and half-yearly?

Answer:

The interest is compounded yearly

$$CI = \left[20000 \times \left(1 + \frac{10}{100} \right) \times \left(1 + \frac{\frac{1}{2} \times 10}{100} \right) \right]$$

$$\therefore \left(20000 \times \frac{110}{100} \times \frac{105}{100} \right) = 23100$$

When interest is compounded half-yearly,

$$CI = \left[20000 \times \left(1 + \frac{\frac{10}{2}}{100} \right)^3 \right]$$

$$\therefore \left(20000 \times \frac{105}{100} \times \frac{105}{100} \times \frac{105}{100} \right) = 23152.5$$

$$\text{Difference} = \text{Rs. } (23152.5 - 23100) = 52.5$$

Answer = c i Rs.52.5

108. What annual payment will discharge a debt of Rs.7308 due in 3 years at the rate of 40% compound interest?

Answer:

Let each instalment be Rs. x.

$$\therefore \frac{x}{\left(1 + \frac{40}{100} \right)} + \frac{x}{\left(1 + \frac{40}{100} \right)^2} + \frac{x}{\left(1 + \frac{40}{100} \right)^3} = 7308$$

$$\therefore \frac{5x}{7} + \frac{25x}{49} + \frac{125x}{343} = 7308$$

$$x = \frac{7308 \times 343}{545} = 4599.346 = \text{Rs. } 4600$$

109. A man borrowed Rs.30000 at 15% per annum simple interest and immediately lent the whole sum at 15% per annum compound interest. What does he gain at the end of 3 years?

Answer:

$$CI = \left[30000 \times \left(1 + \frac{15}{100} \right)^3 - 30000 \right]$$

$$\therefore \left(30000 \times \frac{23}{20} \times \frac{23}{20} \times \frac{23}{20} \right) - 30000 = 45626.25 - 30000 = 15626.25$$

$$SI = \frac{30000 \times 15 \times 3}{100} = 13500$$

$$\text{Gain} = CI - SI = 15626.25 - 13500 = 2126.25$$

Answer = b i Rs.2126.25

110. The principal amounts to Rs.27000 in 4 years at 20% per annum in compound interest. Then find the principle?

Answer:

$$\text{According to the formula } P = \left[\frac{A}{(1 + r/100)^T} \right] = \frac{27000}{(1 + 20/100)^4} = 27000 \times 5/6 \times 5/6 \times 5/6 \times 5/6 = 13020.83$$

Therefore, Principal = 13020.83

111. A box contains 5 Sony, 6 Samsung and 4 Sandisk pen drives. 3 pen drives are drawn at random. What is the probability that they are not of the same company?

Answer:

The total number of pen drives = 5 + 6 + 4 = 15

$$n(S) = {}^{15}C_3 = (15 \times 14 \times 13) / (3 \times 2) = 455$$

Now, 3 pen drives out of 15 pen drives can be drawn in 455 ways.

If all 3 pen drives are of the same company

It Can be done in ${}^5C_3 + {}^6C_3 + {}^4C_3 = 10 + 20 + 4 = 34$ ways

Probability that all 3 pen drives are not of the same company = $1 - (34/455) = (421/455)$

112. The base of a triangular field is 660 metres and height 440 metres. If the charges for watering the field are at the rate of Rs.26.5 per sq hectometre, find the total cost to water the triangular field.

Answer:

Area of the field = (Base x Height) / 2 = $(660 \times 440)/2$ sq metre = $(660 \times 440)/(2 \times 100 \times 100)$ sq metre = 14.52 sq hectometres

Cost of watering 1 sq hectometre = Rs.26.5

Cost of watering the field = $26.5 \times 14.52 = \text{Rs.}384.78$

113. In a mixture of milk and water the proportion of milk by weight was 70%. If in a 250-gm mixture 100 gm water was added, what would be the percentage of water?

Answer:

Proportion of milk in the mixture = $250 \times (70/100) = 175\text{gm}$

Water = 75 gm

After 100 gm water added in mixture the percentage of water = $(75 + 100) / (250 + 100) \times 100 = (175/350) \times 100 = 50\%$

114. Two pipes can fill a tank in 28 and 24 minutes respectively and a waste pipe can empty 5 gallons per minute. All three pipes working together can fill the tank in 16 minutes. How much time is taken by the waste pipe to empty the full tank?

Answer:

Let the capacity of the tank be 336 litres

LCM of (28, 24 and 16 = 336)

Waste pipe empties the tank in $(12 + 14 - 21) \times 5$ litres per minute

Waste pipe empties the tank in $(336/5) = 67.2$ minutes

115. A box contains 6 black and 14 white balls, out of which 3 black and 5 white balls are defective. If we choose two balls at random, what is the probability that either both are white or both are non-defective?

Answer:

Required probability - ${}^{14}C_2/{}^{20}C_2 + {}^{12}C_2/{}^{20}C_2 - {}^9C_2/{}^{20}C_2 = 121/190$

116. In a class, the average age of some boys is 16 years, and average age of 16 teachers is 56 years. If the average age of the combined group of all the teachers and boys is 20, then the number of students is

Answer:

Use allegation method

number of boys 'x' : number of teacher '16'

. 16 : 56

. : 20

. (56-20)=36 : (20-16)=4

. So $36/4 = 9/1$

Now, $x/16 = 9/1$, $x=144$

117. A started a business with initial investment of rs.12000, after 3 month B invest rs.15000 in this business. After 8 month from starting A withdrew one-fourth of his investment and B further invest 1/15 part of his investment. If at the end of one year the difference between the shares of profit of both is 700, what is the B's profit share?

Answer:

$(12000 \times 8 + 9000 \times 4) : (15000 \times 5 + 16000 \times 4)$

132 : 139

Difference in profit sharing ration is = $139x - 132x = 7x$

Given $7x = 700$, So $x = 100$

B's profit share = $139x = 13900$

118. There are three taps A, B, and C. A takes thrice as much time as B and C together to fill the tank. B takes twice as much time as A and C to fill the tank. In how much time can the Tap C fill the tank individually, if they would require 10 hours to fill the tank, when opened simultaneously?

Answer:

Let A, B, C fills a, b, c units per hour.

Total units = $10 \times (a+b+c)$

Now, $3a = b+c$ and $2b = a+c$

Solving both,

$b = 4c/5$ and $a = 3c/5$

total units of work = $10c \times (4/5 + 3/5 + 1) = 24c$

done by C in $24c/c = 24$ hours

119. The probability that a number selected at random from the first 52 natural numbers is a composite number is _____

Answer:

15 prime, 36 composite and '1' is neither prime nor composite

120. A and B together can do a piece of work in 15 days, while B and C together can do in 24 days. After A worked alone for 5 days and B alone for 11 days, C finished it in 21 days. In how many days can C alone finish the entire work?

Answer:

$$a+b=1/15$$

$$b+c=1/24$$

$$5a+11b+21c=1$$

$$5a+5b+6b+6c+15c=1$$

$$5(a+b)+6(b+c)+15c=1$$

$$C=1/36$$

121. Karan decided to donate x% OF HIS SALARY TO charity but on the day of donation he changed his mind and instead donated Rs 3500 which was 58% of what he decided earlier. If Karan's salary is 38000 then find x.

Answer:

$$(x/100)*(58/100)*38000=3500$$

122. X speaks the truth in 40 percent of the cases and Y in 60 percent of the cases. Each of them is asked a series of questions, for which the answer can be only yes or no. What is the probability that they will contradict each other in answering a particular question?

Answer:

$$P(X)=40/100=2/5$$

$$P(Y)=60/100=3/5$$

$$P(X \cap \bar{Y}) + P(\bar{X} \cap Y) = P(X) * P(\bar{Y}) + P(Y) * P(\bar{X}) = 2/5 * 2/5 + 3/5 * 3/5 = 13/25$$

123. I bought 3 pen, 4 pencil and 7 eraser that costed me Rs 83, then I bought 2 pen, 1 pencil and 3 eraser and that costed me Rs 17. If I have to buy 2 pen, 2 pencil and 4 eraser how much do I need to pay?

Answer:

$$3\text{pen} + 4\text{Pencil} + 7\text{eraser} = 83$$

$$2\text{pen} + 1\text{pencil} + 3\text{eraser} = 17$$

$$\text{On adding } 5\text{pen} + 5\text{pencil} + 10\text{ eraser} = 100$$

$$\text{Pen} + \text{pencil} + 2\text{eraser} = 20$$

124. The sum of age A and B is 53. After 5 years the ratio of their age will be 2:1. What is the difference between their age?

Answer:

$$A+b=53$$

$$A+5/b+5=2:1$$

$$\text{On solving } a=37, b=16$$

125. If a five digit number is formed with digits 1, 2, 3, 4 and 5. What is the probability that it will be divisible by 25, if repetition is not allowed?

Answer:

Last two digits must be 25

Therefore first three digits can be arranged in 3! Ways and total number = 5!

$$\text{Hence } 3!/5! = 1/20$$

126. A boat travelling at a speed of 50 kmph started at 1 p.m. when there was no current from point A for point B which is X km apart. At 3:15 p.m. current started which fastened the entire journey by certain minutes. The speed of boat is 5 times to the speed of current and if the total time taken is 5 hours, find X?

Answer:

$$\text{Speed of boat} = 50$$

$$\text{Speed of current} = 10$$

$$\text{Speed of boat in current} = 60$$

$$\text{Time taken} = 5\text{hour}$$

$$50 * 9/4 + 60 * 11/4 = 112.5 + 165 = 277.5$$

127. A, B and C started business with a total investment of 63000. A invested 6000 more than B and C invested 15000 less than B. If A's profit at the end of year is 30000. What is total profit made by B and C?

Answer:

$$A+B+C=63000$$

$$A-b=6000$$

$$B-C=15000$$

$$\text{On solving } A=30000, B=24000, C=9000$$

128. Neeru and Siva invested Rs. 1600 and Rs. 1200 respectively. After 3 months, Neeru withdrew Rs. 500 while Siva invested Rs. 500 more. After 3 more months Shivani joins the business with a capital of Rs. 2100. The share of Siva exceeds that of Shivani, out of a total profit of Rs. 2640 after one year by

Answer:

Neeru:Siva: Shivani= (1600*3 + 1100*9):(1200*3 + 1700*9):(2100*6) = 147:189:126 = 7:9:6

Difference of Siva and Shivani shares = Rs. [2640 * (9/22) — 2640 * (6/22)] = Rs. 360

129. Find the area of trapezium whose parallel sides are 12 cm and 17 cm long, and the distance between them is 13**Answer:**

$$\text{Area} = \frac{1}{2} * (12+17) * 13$$

130. Three vessels containing sugar solutions the concentrations of sugar as 0.5, 0.25 and 0.75 respectively. Six litres from the first, fourlitres from the second and 12litres from the third are mixed. What is the ratio of water and sugar in the resultant mixture?**Answer:**

According to the question,

$$6*0.5+4*0.75+12*0.25/6*0.5+4*0.25+12*0.75=9/13$$

131. A and B together can complete a task in 9 days. B and C together can complete the same task in 16 days. A and C together can complete the same task in 6 days. If A worked alone for 2 days, then B worked alone for 14 days, and then C worked alone for 4 days, what percentage of the task remains to be completed?**Answer:**

Let the work be taken as 144 units [LCM (9, 16 6) = 144]

$$(A+B)\text{'s one day's work} = \frac{144}{9} = 16 \text{ units.}$$

$$(B+C)\text{'s one day's work} = \frac{144}{16} = 9 \text{ units.}$$

$$(C+A)\text{'s one day's work} = \frac{144}{6} = 24 \text{ units.}$$

$$2(A+B+C)\text{'s one day's work} = 49$$

$$(A+B+C)\text{'s one day's work} = \frac{49}{2} \text{ units.}$$

$$\text{Now, A's one day's work} = \frac{49}{2} - 9 = \frac{31}{2} \text{ units.}$$

$$\text{B's one day's work} = \frac{49}{2} - 24 = \frac{1}{2} \text{ units}$$

$$\text{C's one day work} = \frac{49}{2} - 16 = \frac{17}{2}$$

Total work done by A, B, C each doing alone

$$= \left(2 \times \frac{31}{2} + 14 \times \frac{1}{2} + 4 \times \frac{17}{2} \right)$$

$$= 31 + 7 + 34 = 72 \text{ units.}$$

Required work yet be completed

$$= \left(\frac{144 - 72}{144} \right) \times 100 = 50\%.$$

132. If 15:13 is the ratio of present age of Riya and Siva respectively and 17:11 is the ratio between Riya's age 4 years hence and Siva's age 4 years ago. Then what will be the ratio of Riya's age 4 years ago and Siva's age 4 years hence ?**Answer:**

Let the present age of Riya and Siva be 15X and 13X respectively.

Given, Riya's age 4 years hence and Siva's age 4 years ago in the ratio 17:11

$$\text{That is, } 15X + 4 / 13X - 4 = 17/11$$

$$11(15X + 4) = 17(13X - 4)$$

$$165X + 44 = 221X - 68$$

$$56X = 112$$

$$X = 2$$

Therefore Riya=30

Siva=26

$$\text{Ratio} = 30 - 4 / 26 + 4 = 13/15$$

133. A man rows 4 km upstream in 2 hours and 8 km downstream in 3 hours then how long(approx) will he take to cover 16 km in still water?**Answer:**

Distance covered in downstream = 8 km

Time taken in downstream = 3 hours.

Rate of downstream = distance / time = 8km / 3 hours = 8/3 km/hr.

Distance covered in upstream = 4 km

Time taken in upstream = 2 hours.

Rate of upstream = distance / time = 4 km / 2 hours = 2 km/hr.

Speed in still water = (upstream + downstream)/2 = (1/2)(8/3 + 2) = (1/2)(14/3) = 7/3 km/hr.

Time Taken to cover 16 km in still water = distance / speed = 16 x 3/7 = 48 / 7 = 7 hours (approximately).

134. Harish bought a book for Rs.485 and sold it at 20% loss. By using that amount he bought another book and sold it at 15% profit. Then overall profit/loss amount is:

Answer:

$$485 \times .8 \times 1.15 = 485 \times .92 = 446.20$$

$$\text{Therefore loss} = 485 - 446.20 = 38.8 \text{Rs}$$

135. Two friends A and B simultaneously start running around a circular track . They run in the same direction. A travels at 8 m/s and B runs at b m/s. If they cross each other at exactly three points on the circular track and b is a natural number less than 20, how many values can b take?

Answer:

Let track length be equal to T.

Time taken to meet for the first time = T/relative speed = $T/8-b$ or $T/b-8$

Time taken for a lap for A = $T/8$

Time taken for a lap for B = T/b

So, time taken to meet for the first time at the starting point = $\text{LCM}(T/8, T/b) = T/\text{HCF}(8, b)$

Number of meeting points on the track = Time taken to meet at starting point / Time taken for first meeting = Relative speed / HCF (8, b).

$$(8-b)/\text{HCF}(8, b) = 3 \text{ or } (b-8)/\text{HCF}(8, b) = 3$$

$b = 2, 5, 11, 14$ satisfy this equation. So, there are four different values that b can take.

136. A student scored 23% of maximum marks and failed by 23 marks. But if he scores 43% of the marks in the same exam, he passes by 17 marks. What is the maximum marks of the exam?

Answer:

Let, maximum marks = x

$$(43-23)\% \text{ of } x = (23+17)$$

$$20\% \text{ of } x = 40$$

Solving we get, $x = 200$

137. If the price of sugar is increased by 20%, its expenditure gets decreased by 25%. What is the net effect on the total sale?

Answer:

Use successive method

$$20 + (-25) + (20)(-25)/100 = -10$$

138. A invested Rs.50000 for starting a venture and B joined his business with a capital of 65000 after 4 months. A get Rs.350 in every 2 months for his extra work. Find B's profit if A receives a total of Rs.62100 as his share.

Answer:

$$(50000 \times 12) : (65000 \times 8) = 15 : 13$$

$$\text{Now, } (62100 - 350 \times 6) = 60000$$

$$\text{B's profit} = 60000 \times 13/15 = 52000$$

139. Two trains having equal speed take 10 seconds and 15 seconds respectively to cross a 250 meter long bridge. If the length of second train is 150 meters more than the first train, then find the speed of the trains?

Answer:

Let, length of first train = x

$$(x + 250)/10 = (x + 150 + 250)/15$$

Solving, we get $x = 50$

$$\text{Speed} = 300/10 \text{ or } 450/15 = 30 \text{m/s}$$

$$\text{Convert this speed into km/h, } 30 \times 18/5 = 108 \text{km/h}$$

140. A train 75 m long overtook a person who was walking at the rate of 6 km/hr, passed him in 7 1/2 seconds. Also it overtook a second person in 6 3/4 seconds. What was the speed of the second person?

Answer:

Let, speed of train in km/h = x

$$(x-6) \times 5/18 = 75 \times 2/15,$$

Solving, we get = 42 km/h

Now, assume speed of second person is y km/hr,

$$\text{So, } (42-y) \times 5/18 = 75 \times 4/27$$

Solving, we get $y = 2 \text{km/h}$

141. Thirteen litres are drawn from a cask full of water and then it is filled with milk. Now thirteen litres of mixture are drawn and the cask is again filled with milk. The ratio of quantity of water now left in the cask to that of the milk in it is 16 : 9. How much does the cask hold?

Answer:

Let x litres is total capacity of cask

Using formula, amount of water left in cask = $x [1 - 13/x]^2$

$$[1 - 13/x]^2/x = 16/(16+9)$$

Solving we get, $x = 65 \text{ l}$

142. A reduction of 40% in the price of wheat would enable a purchaser to obtain 36 kg more for Rs. 45. What is the reduced price per kg?

Answer:

Assume, purchaser buy 100 kg in Rs.45

Now the new price is $60/100 * 45 = 27$,

It means in Rs. (45-27) = 18, 36kg more wheat is purchased.

Rs 18= 1800p

Now, $1800/36= 50$ p

143. A dishonest rice seller sells rice at 15% profit of rice CP, and he also uses 800gm weight in place of 1kg. Find his total profit percent.

Answer:

Initial profit on CP = 15%

Again profit, $(1000-800)/800 * 100 = 25\%$

Use successive method,

$15 + 25 + (15)(25)/100 = 43.75\%$ or $43 \frac{3}{4} \%$

144. Sides of the parallelogram are in the ratio of 4:3, and its area is 1500 sq. units. Altitude on the greater side is 15 units. Find out the Altitude on the smaller side is?

Answer:

Let the side of parallelogram be = $4x$ and $3x$

Area of parallelogram = base * height

Given area= 1500 units, so,

$4x * 15 = 1500$

$x = 25$ units

Sides = $4 * 25$ and $3 * 25 = 100$ and 75 units,

Now, height = $1500/75 = 20$ units

145. A bag contains 6 red balls, 11 yellow balls and 5 pink balls. If two balls are drawn at random from the bag, one after another, what is the probability that the first ball is red and the second ball is yellow?

Answer:

Total of balls = $6 + 11 + 5 = 22$

$n(S) = {}^{22}C_2 = (21 * 22) / 2 = 231$

Now, $n(E) = {}^6C_1 * {}^{11}C_1 = 6 * 11 = 66$

$P(E) = n(E)/n(S) = 66/231 = 6/21 = 2/7$

146. The sum of the radius and the height of a cylinder is 19m. The total surface area of the cylinder is 1672 m², what is the volume of the cylinder? (in m³)

Answer:

Let the radius of the cylinder be r and height be h .

Then, $r + h = 19$ (i)

Again, total surface area of cylinder = $(2\pi rh + 2\pi r^2)$

Now, $2\pi r(h + r) = 1672$

or, $2\pi r * 19 = 1672$

or, $38\pi r = 1672$, $\pi r = (1672/38) = 44$ m, $r = (44 * 7) / 22 = 14$

Height = $19 - 14 = 5$ m

Volume of cylinder = $\pi r^2 h = (22/7) * 14 * 14 * 5 = 14m = 22 * 2 * 14 * 5 = 3080m^3$

147. The ratio of the speed of the boat upstream to the speed of the boat downstream is 2 : 3. What is the speed of the boat in still water if it covers 42 km downstream in 2 hours 20 minutes? (in km/h)

Answer:

Let the speed of the boat in still water be x and that of the current be y .

Then, downstream speed = $x + y$ and upstream speed = $x - y$

Now, downstream speed = $42 / [2 \frac{20}{60}] = (42 * 3) / 7 = 18$ km

$x + y = 18$

Again, 3 : 18, 2 : 12

(As ratio of downstream to upstream is 2 : 3)

$x - y = 12$ Solving (i) and (ii), we get

$(x + y = 18) + (x - y = 12) = 2x = 30$

$x = 15$ kmph

Hence speed of the boat 15 kmph

148. 35 men complete a piece of work in 16 days and 20 women complete the same piece of work in 30 days. What is the ratio of the amount of work done by 40 men in 1 day to the amount of work done by 15 women in 1 day?

Answer:

35 men complete the work in 16 days.

1 man completes the work in 16×35 days,

32 men complete the work in $(16 \times 35)/40 = 14$ days.

Again, 20 women complete the same piece of work in 30 days.

1 woman completes the same piece of work in 20×30 days.

15 women can complete the work in $(20 \times 30)/15 = 40$ days.

Ratio = $1/14 : 1/40 = 40 : 14 = 20 : 7$

149. A man sold an article for Rs. 6800 and incurred a loss. Had he sold the article for Rs.7850, his gain would have been equal to half of the amount of loss that he incurred. At what price should he sell the article to have 20% profit?

Answer:

Let the cost price be x .

Then, loss = $(x - 6800)$

Again, profit = $(7850 - x)$

Now, $(7850 - x) = (x - 6800)/2$ or, $15700 - 2x = x - 6800$

or, $3x = 15700 + 6800 = 22500$

$x = 22500/3 = 7500$

Selling price = $(7500 \times 120)/100 = \text{Rs. } 9000$

150. A bought a certain quantity of bananas at a total cost of Rs. 1500. He sold 1/3 of these bananas at 25% loss. If he earns an overall profit of 10%, at what percentage profit did A sell the rest of the bananas?

Answer:

Total CP = 1500

Total SP = $1500 + 10\%$ of 1500 = $1500 + 150 = 1650$

CP of 1/3 of bananas = $1500/3 = \text{Rs. } 500$

SP of 1/3 of bananas at 25% loss = $500 - [(500 \times 25 / 100)] = 500 - 125 = 375$

SP of the rest of bananas = $1650 - 375 = 1275$

Now, CP of the rest of bananas = $1500 - 500 = 1000$

Profit on the rest of bananas = $1275 - 1000 = 275$

% of profit on the rest of bananas = $(275/1000) \times 100 = 27.5\%$

151. A tank has two inlets: P and Q. P alone takes 6 hours and Q alone takes 8 hours to fill the empty tank completely when there is no leakage. A leakage was caused which would empty the full tank completely in 'X' hours when no inlet is open. Now, when only inlet P was opened, it took 15 hours to fill the empty tank completely. How much time will Q alone take to fill the empty tank completely? (in hours)

Answer:

$(1/P) - (1/X) = (1/15)$

Or, $(1/6) - (1/X) = (1/15)$ ($P = 6$ hours)

Or, $(1/X) = (1/6) - (1/15) = (10-4)/60 = 1/10$

$x = 10$ hours

Now,

$(1/Q) - (1/10) = (1/8) - (1/10) = (5-4)/40 = 1/40$

Hence, Q fills the tank in 40 hours.

152. At present, the ratio of the ages of A to B is 3 : 8; and that of A to C is 1 : 4. Three years ago, the sum of the ages of A, B and C was 83 years. What is the present age (in years) of C?

Answer:

According to the question, $A : B = 3 : 8$

$A : C = 1 : 4$

$B : A = 8 : 3$

$A : C = 1 : 4$

$8 : 3 : 12$

Sum = $8x + 3x + 12x = 23x$

Now, $23x = 92$

$x = 4$

Hence the present age of C = $12x = 12 \times 4 = 48$ years

153. The sum invested in Scheme B is thrice the sum invested in Scheme A. The investment in Scheme A is made for 4 years at 8% p.a. simple interest and in Scheme B for 2 years at 13% p.a. simple interest. The total interest earned from both the schemes is Rs.1320. How much amount was invested?

Answer:

Let the amount invested in scheme A be Rs.x and that in B be Rs. 3x.

Then, $[(x \times 4 \times 8)/100] + [(3x \times 2 \times 13) / 100] = 1320$

Or, $(32x/100) + (78x/100) = 1320$

$110x/100 = 1320$

$x = (1320 \times 100) / 110 = \text{Rs. } 1200$

154. Kim and Om are travelling from point A to B, Which are 400 km apart. Travelling at a certain speed Kim takes one hour more than Om to reach point B. If Kim doubles her speed she will take 1 hour 30 mins less than Om to reach point B. At what speed was Kim Driving from point A to B? (in kmph)

Answer:

Let the speed of Kim be x and that of Om be y.

Then, $(400/x) - (400/y) = 1$

Let $1/x = u$ and $1/y = v$

$400u - 400v = 1$... (i)

Again, $(400/y) - (400/2y) = 3/2$

$400v - 200u = (3/2)$

Or, $800v - 400u = 3$... (ii)

Solving (i) and (ii), we get

$(400u - 400v = 1) + (-400u + 800v) = 400v = 4$

$v = (4/400) = (1/100) \text{ km}$

$y = 100 \text{ km}$

now, $(400/x) - (400/100) = 1$

or, $(400/x) = 5 \Rightarrow x = 80 \text{ kmph}$

155. The ratio of a two-digit natural number to a number formed by reversing its digits is 13 : 31. Which of the following is the sum of all the numbers of all such pairs?

Answer:

Number = $10a + b$

Reverse = $a + 10b$

$10a + b / a + 10b = 13/31$

$a/b = 1/3$

Therefore numbers = 13, 26, 39

156. 1 unit of x% alcohol is mixed with 4 units of y% alcohol to give 50% alcohol. If $x > y$, how many integer values can x take?

Answer:

$x > y$

$\Rightarrow x > 50 > y$.

$(x - 50) = 4(50 - y)$.

$50 - y$ is an integer

$\Rightarrow x - 50$ has to be a multiple of 4

x can take values {54, 58, 62 98} - x can take total of 12 values.

157. 42 men can complete a piece of work in 15 days and 52 women can complete the same work in 21 days. What is the ratio of the amount of work done by 7 men to that done by 13 women, in 1 day?

Answer:

42 men one day work = $1/15$

7 men one day work = $7/(15 \times 42) = 1/90$

52 women one day work = $1/21$

13 women one day work = $13/(21 \times 52) = 1/84$

Ratio = $84/90 = 14/15$

158. The present average age of a family of six members is 28 years. If the present age of the youngest member in the family is EIGHT years, then what was the average age of the family at the time of the birth of the youngest member?

Answer:

Sum of present age of all 6 = $6 \times 28 = 168$

sum of Present age of rest 5 = $168 - 8 = 160$

Sum of present age of rest 5, 8 years ago = $160 - 40 = 120$

Hence average = $120/6 = 20$

159. Sohan and Mohan enters into a partnership with their capitals in the ratio 7 : 4. At the end of 7months, Mohan withdraws his capital. If they receive their shares profits in the ratio 7 : 8, find out how long Sohan's capital was invested in the business?

Answer:

$$7 \times \frac{x}{4} \times 7 = \frac{7}{8}$$

$$X=3.5$$

160. A milkman mixes 20 lites of water with 80 litres of milk. After selling one-fourth of this mixture, he adds water to replenish the quantity that he has sold. What is the current proportion of water to milk ?

Answer:

1/4th of the mixture is sold

1/4th of milk and 1/4th of water is sold.

= 3/4th of milk = $(\frac{3}{4}) \times 80 = 60$ litres of milk is remaining and rest part $100 - 60 = 40$ litres is water (as water is a added in place of milk)

Reqd ratio = 40 : 60 = 2 : 3

161. A shopkeeper buys an article at a discount of 20% on the listed price from a wholesaler. The shopkeeper marks up the price by 15% on the listed price. A buyer pays Rs.3795 to get it after paying sales tax at the rate of 10% on the price asked for. Find the profit percentage of the shopkeeper.

Answer:

Let the listed price = Rs. 100

CP of shopkeeper = $100 - 20 = \text{Rs. } 80$

Marked price by shop keeper = $100 + 15 = \text{Rs. } 115$

Now, $115 = 3795 \times (\frac{100}{110}) = 3450$

$80 = (\frac{3450}{115}) \times 80 = \text{Rs. } 2400$

CP of shopkeeper = Rs. 2400

Profit = $3450 - 2400 = 1050$

Profit % = $(\frac{1050}{2400}) \times 100 = 43.75\%$

162. A sum amounts to Rs.10580 in 2 years and to Rs.12167 in 3 years compounded annually. Find the sum and the rate of interest per annum.

Answer:

$$12167 = 10580 [1 + (\frac{r}{100})]^3$$

$$\text{Or, } (\frac{12167}{10580}) = 1 + (\frac{r}{100})$$

$$\text{Or, } (\frac{12167}{10580}) - 1 = \frac{r}{100}$$

$$r = (\frac{12167 - 10580}{10580}) \times 100 = 15\%$$

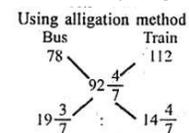
$$\text{sum} = \frac{10580 \times 100 \times 100}{(115 \times 115)} = \text{Rs. } 8000$$

Sum = Rs. 8000, Rate = 15%

163. Mohit travels 972 km in 10.5 hours in two stages. In the first part of the journey, he travels by bus at the speed of 78 km, per hour. In the second part of the journey, he travels by train at the speed of 112 km/hr. How much distance does the travel by train?

Answer:

We use only alligation on speed (km/hr) to get ratio of time spent in bus and train. overall speed = $(\frac{972}{10.5}) = (\frac{1944}{21}) = 648/7$



$$136/7 : 102/7 \rightarrow 136 : 102$$

Or 4 : 3

Time spent in train = $10.5 (\frac{3}{7}) = 4.5$ hours

Distance travelled by train = 112×4.5 hours = 504 km

164. A contractor undertook to do a certain work in 75 days and employed 48 men to do it. After 55 days he found that only (2/3) of the work was done. How many more men must be employed so that the work may finished in time?

Answer:

Apply $M_1 D_1 / W_1 = M_2 D_2 / W_2$

$$\text{Or, } (48 \times 55) / (\frac{2}{3}) = (M \times 20) / (\frac{1}{3})$$

$M = 66$ men

Reqd more men = $66 - 48 = 18$ men

165. 49 pumps can empty a reservoir in 17/2 days working 6 hours a day. If 119 pumps are used for 7 hours a day then in how many days will the same work be completed?

Answer:

Let the required number of days be x.

$$49 \times (\frac{17}{2}) \times 6 = 119 \times 7 \times x$$

$x = 3$ days

166. 6 kg of an alloy A is mixed with 8 kg of alloy B. If alloy A has lead and tin the ratio 1 : 3 and B has tin and copper in the ratio 2 : 3, then what is the amount of tin in the new alloy?

Answer:

Quantity of tin in alloy A = $6 \times (3/4) = 4.5$ kg

Quantity of tin in alloy B = $8 \times (2/5) = 3.2$ kg

Quantity of tin in the new alloy = $4.5 + 3.2 = 7.7$ kg

167. There are 5 boys and 4 girls. In how many ways can they be seated in a row so that all the girls do not sit together?

Answer:

Total number of persons $5 + 4 = 9$

When there is no restriction they can be seated in a row in $9!$ Ways. But if all the 4 girls sit together, we can consider the group of 4 girls as one person. Therefore, we have only $5 + 1 = 6$ persons

Number of ways = $6!$ Ways

But 4 girls can be arranged among themselves in ${}^4P_4 = 4!$ Ways

Reqd no. of ways in which all the 4 girls do not sit together = $9! - 6! \times 4!$

= $9 \times 8 \times 7 \times 6! - 6! \times 24 = 6! (504 - 24) = 720 \times 480 = 720 \times 480 = 345600$

168. The difference between 20% of a number and 4/5th of same number is 2499. What is 2/7th of that number?

Answer:

Let the number be N .

Then, $4/5 N - 20/100 N = 2499$

$4/5 N - N/5 = 2499 \Rightarrow N(3/5) = 2499 \Rightarrow N = (2499 \times 5)/3 = 833 \times 5 = 4165$

Again, $2/7$ of $N = 2/7 \times 4165 = 2 \times 595 = 1190$

169. Prithvi spent Rs. 89745 on his college fees, Rs. 51291 on personality development classes and the remaining 27% of the total amount he had as cash with him. What was the total amount?

Answer:

Here, money spent on college fees = Rs. 89745

Money spent on personality development classes = Rs. 51291

Total amount = $89745 + 51291 =$ Rs. 141036

Now, remaining amount = $(100 - 27)\% = 73\%$

So, $73\% = 141036$

$\Rightarrow 1\% = 141036/73$

$\Rightarrow 100\% = 141036/73 \times 100 =$ Rs. 193200

170. Vaishali spent Rs. 31897 on the air conditioner for the home, Rs. 38789 on buying plasma television and the remaining 23% of the total amount she had as cash with her. What was the total amount?

Answer:

Here, money spent on buying air conditioner = Rs. 31897

Money spent on buying plasma television = Rs. 38789

\therefore Total money spent = $31897 + 38789 =$ Rs. 70686

Now, she has left with 23% of total cash

Hence, $77\% = 70686 \Rightarrow 1\% = 70686/77$

$\Rightarrow 100\% = 70686/77 \times 100 = 918 \times 100 =$ Rs. 91800

171. Beena spend Rs. 44668 on her air tickets, Rs. 56732 on buying gifts for the family members and the remaining 22% of the total amount she had as cash with her. What was the total amount?

Answer:

Money spent on air tickets = Rs. 44668

Money spent on buying gifts = Rs. 56732

Total amount = Rs. 101400

This is equal to = $(100 - 22)\% = 78\%$ of total money

So, $78\% = 101400 \Rightarrow 1\% = 101400/78$

$\therefore 100\% = 101400/78 \times 100 =$ Rs. 130000

172. A sum of Rs. 731 is divided among A, B and C, such that A receive 25% more than B and B receives 25% less than C. What is C's share in the amount?

Sol. Let C's share in the amount be Rs. x

$$\text{Then, B's share} = x \times \frac{75}{100} = \frac{3x}{4}$$

$$\text{A's share} = \frac{3x}{4} \times \frac{125}{100} \\ = \frac{375x}{400}$$

Now, A + B + C = 731

$$\Rightarrow \frac{375x}{400} + \frac{3x}{4} + x = 731$$

$$\Rightarrow \frac{375x + 300x + 400x}{400} = 731$$

$$\Rightarrow 1075x = 731 \times 400$$

$$\Rightarrow x = \frac{731 \times 400}{1075}$$

$$= \frac{17 \times 400}{25} = 17 \times 16 = \text{Rs. } 272$$

173. Mr Giridhar spends 50% of his monthly income on household items and out of the remaining, he spends 50% on transport, 25% on entertainment, 10% on sports and remaining amount of Rs. 900 is saved. What is Mr Giridhar's monthly income?

Answer:

Let Giridhar's monthly income be Rs. 100

Then, money spent on household's item = $100 \times 50/100 = \text{Rs. } 50$

Remaining amount = $100 - 50 = \text{Rs. } 50$

Money spent on transport = $50 \times 50/100 = \text{Rs. } 25$

Money spent on entertainment = $50 \times 25/100 = \text{Rs. } 12.5$

Money spent on sports = $50 \times 10/100 = \text{Rs. } 5$

\therefore Last remaining amount = $100 - (50 + 25 + 12.5 + 5)$

$100 - (92.5) = \text{Rs. } 7.5$

\therefore Rs. 7.5 is saved, when total income is Rs. 100

\therefore Rs. 1 is saved, when total income = $100/7.5$

Now, Rs. 900 is saved, when total income = $100/7.5 \times 900 = 100 \times 120 = \text{Rs. } 12000$

174. Mr X spends 20% of his monthly income on household expenditure. Out of the remaining 25% he spends on children's education, 15% on transport, 15% on medicine and 10% on entertainment. He is left with Rs. 9800 after incurring all these expenditures. What is his monthly income?

Answer:

Let Mr X monthly income be Rs. 100

Then, money spent on household expenditure = $100 \times 20/100 = \text{Rs. } 20$

\therefore Remaining amount = $100 - 20 = \text{Rs. } 80$

Money spent on children's education = $80 \times 25/100 = \text{Rs. } 20$

Money spent on transport = $80 \times 15/100 = \text{Rs. } 12$

Money spent on medicine = $80 \times 15/100 = \text{Rs. } 12$

Money spent on entertainment = $80 \times 10/100 = \text{Rs. } 8$

\therefore Last remaining amount = $100 - (20 + 20 + 12 + 12 + 8) = 100 - 72 = \text{Rs. } 28$

Now, Rs. 28 is left, when total income is Rs. 100

Rs. 1 is left, when total income = $100/28$

\therefore Rs. 9800 is left, when total income = $100/28 \times 9800 = \text{Rs. } 35000$

175. In a class of 35 students and 6 teachers, each student got sweets that are 20% of the total number of students and each teacher got sweets that are 40% of the total number of students. How many sweets were there?

Answer:

Here, sweets that are got by each student = $20/100 \times 35 = 7$

\therefore Total number of sweets distributed students = $35 \times 7 = 255$

Now, sweets that are got by each teacher = $40/100 \times 35 = 14$

\therefore Total number of sweets distributed to teachers = $6 \times 14 = 84$

So, total number of sweets = $255 + 84 = 339$

176. In a class of 80 students and 5 teachers, each student got sweets that are 15% of the total number of students and each teacher got sweets that are 25% of the total number of students. How many sweets were there?

Answer:

Here, number of sweets got by each student = $80 \times 15/100 = 12$

So, total number of sweets got by all students = $12 \times 80 = 960$

Number of sweets got by each teacher = $80 \times 25/100 = 20$

So, total number of sweets got by all teachers = $20 \times 5 = 100$

\therefore Total number of sweets which are distributed to teachers and students = $960 + 100 = 1060$

177. 405 sweets were distributed equally among children in such a way that the number of sweets received by each child is 20% of the total number of children. How many sweets did each child receive?

Answer:Let total number of children be x Then, each child gets $(x \times 20/100)$ sweetsNow, $x/5 \times x = 405 \Rightarrow x^2 = 405 \times 5 \Rightarrow x^2 = 81 \times 25 \Rightarrow x = 9 \times 5 = 45$ sweetsPer child = $405/45 = 9$ **178. A candidate appearing for an examination has to secure 35% marks to pass. But he secured only 40 marks and failed by 30 marks. What would be the maximum marks to test?****Answer:**Here, passing marks of nay candidate = $40 + 30 = 70$ Let the total marks be x Then, $x = 35/100 = 70$ $x = 200$ **179. In an election between two candidates, one got 52% of total valid votes. 25% of the total votes were invalid. The total number of votes were 8400. How many valid votes did the other person get?****Answer:**

Answer: Here, total number of votes = 8400

Invalid votes = $8400 \times 25/100 = 2100$ Valid votes = $8400 - 2100 = 6300$ Votes got by one candidate = $6300 \times 52/100 = 3276$ Number of votes got by other candidate = $6300 - 3276 = 3024$ **180. The ratio of students in school A, B and C is 5 : 4 : 7 respectively. If number of students in schools are increased by 20%, 25% and 20% respectively, then what will be the ratio of students in school A, B and C respectively?****Sol.** Here, ratio of students in school, $A : B : C = 5 : 4 : 7$ New ratio = $5 \times \frac{120}{100} : 4 \times \frac{125}{100} : 7 \times \frac{120}{100}$ $= 600 : 500 : 840$ $= 30 : 25 : 42$ **181. Population of a country increases every year by 10%. If the population in January 2006 was 15.8 lakh, what will be the population in January 2008?****Sol.** Here,

Population of the country increases at the rate of 10% every year

Then, overall percentage increase.

 $= 10 + 10 + \frac{10 \times 10}{100} = 21\%$

So, population in January 2008

 $= 15.8 \times \frac{121}{100}$ $= 15.8 \times 1.21$ $= 19.118$ lakh**182. The price of rice decreases by 6.25% and because of this reduction, Vandana is able to buy 1 kg more for Rs. 120. Find the reduced rate of rice.****Sol.** Original price of the sugar = x rs/kgReduced price = $\frac{100 - 6.25}{100} x = 0.9375 x$

She can buy 1kg more with the reduced money

So,

$$\frac{120}{0.9375x} - \frac{120}{x} = 1$$

 $x = \text{Rs. } 8 \text{ kg}$

reduced price = 7.5

183. Jitendra's age is three times the sum of the ages of his two sons. Two years ago, his age was six years less than four times the sum of the ages of his sons. What is the present age of Jitendra?**Answer:**Let the sum of Jitendra's sons be x yearsThen, Jitendra's age = $3x$ Again, $4(x - 2) - 6 = 3x - 2$ or, $4x - 8 - 6 = 3x - 2$ or, $x = 12$ years

Present age of Jitendra = $3 \times 12 = 36$ years

184. An amount of Rs. 6996 is divided among Raju, Babu and Shyam in such a way that if their shares be reduced by Rs. 8, Rs. 12 and Rs. 16 respectively, the remainders shall be in the ratio of 7 : 8 : 9. Find the share of Babu.

Answer:

The amount which is divided among them = $6996 - (8 + 12 + 16) = 6996 - 36 = 6960$

Now, Babu's share = $6960 \times (8/24) + 12 = 2320 + 12 = \text{Rs. } 2332$

185. The weights of two persons Rahul and Rupesh are in the ratio of 4 : 5. Rupesh's weight increased by 20% and the total weight of Rahul and Rupesh together became 135 kg with an increase of 25%. By what per cent did the weight of Rahul increase?

Answer:

Rahul's + Rupesh's weight = $135 (100/125)$

Rahul's weight = $135(4/5)(4/9) = 48 \text{ kg}$

Rupesh's weight = $48 (5/4) = 60 \text{ kg}$

Now, after increase Rupesh's weight

= $60 \times (120/100) = 72 \text{ kg}$

After increase Rahul's weight = $135 - 72 = 63$

Reqd % increase = $[(63-48) / 48] \times 100 = (15/48) \times 100 = 31.25\%$

186. A boat takes 3 hours to travel from place A to place B downstream and back from B to A upstream. If the speed of the boat in still water is 4 kmph what is the distance between the two places?

Answer:

Let the distance from place A to B be x km and the speed of current be y km/hr.

Now, $[x/(4+y)] + [x/(4-y)] = 3$

Or, $(4x - xy + xy + 4x) / [(4 - y) (4 + y)] = 3$

Or, $3 (16 - y^2) = 8x$

Or, $48 - y^2 = 8x$

So, we can't find the distances

187. A train travelling at 57 km/hr passes another train half of its length travelling in the opposite direction at 33 km/hr in 18 seconds. If it passes a railway platform in 1.2 minutes, what is the length of the platform?

Answer:

Distance travelled with relative speed $57 + 33 = 90 \text{ km/hr}$ in 18 seconds = $90 (5/18) \times 18 = 450 \text{ m}$

Ratio of lengths = First : Second train = $2 : 1$

Length of first train = 300 m

Now, distance travelled by 1st train at 57 km/hr in 72 seconds = $57 (5/18) \times 72 = 1140 \text{ m}$

Length of platform = $1140 - 300 = 840 \text{ m}$

188. In a school there are 30 more boys than girls. If the number of boys is increased by 10% and the number of girls is also increased by 45%, there would be nine more girls than boys. What is the number of students in the school?

Answer:

Let there be 'a' boys and 'b' girls

$a - b = 30$

$1.45b - 1.1a = 9$

on solving $a = 150, b = 120$

189. The simple interest accrued on Rs 36500 at the end of five years is Rs. 21900. What would be compound interest accrued on the same amount for same time period (Approx)

Answer:

$36500 * R * 5 / 100 = 21900$

$R = 12\%$

Now

$CI = 36500 * ((1 + 12/100)^5 - 1) = 36500 * (1.76 - 1) = \text{Rs } 27740$

190. Two pipes A and B can fill a cistern in 40 minute and 50 minutes respectively. If both the pipes are opened together, then after how much time should B be closed so that the cistern is full in 30 minutes?

Answer:

Let pipe B be close after x minutes

$X(1/40 + 1/50) + 30 - X(1/40) = 1$

$9X/200 - 5X/200 = 1 - 30/40$

$4X/200 = 10/40$

$X = 12.5$

191. The approximate compound interest accrued on Rs 27000 at the end of three years is Rs. 7012. What would be simple interest accrued on the same amount for same time period (Approx)

Answer:

$$CI = 27000 * ((1 + R/100)^3 - 1)$$

$$7012/27000 = ((1 + R/100)^3 - 1)$$

$$(1 + R/100)^3 = 1.26$$

$$R = 8$$

$$S.I = 27000 * 8 * 3 / 100 = 6480$$

192. The average weight of boys in a class of students is 58 kg, while that of girls is 50 kg. The average weight of the entire class is 53 kg. The number of girls is approximately what per cent of the number of boys in the class?

Answer:

Let the number of boys in the class be x and that of girls be y .

$$\text{Then, } (x \times 58 + 50 \times y) / (x + y) = 53$$

$$\text{or, } 58x + 50y = 53x + 53y$$

$$\text{or, } 5x = 3y$$

$$x/y = 3/5$$

$$\text{Reqd \%} = (5/3) \times 100 = (500/3) = 166 \frac{2}{3}\% = 167\%$$

193. A bag contains 5 red balls, 6 blue balls, 2 green balls and 7 white balls. If 2 balls are picked up at random, what is the probability that both the balls are white in colour?

Answer:

Total number of balls = $5 + 6 + 2 + 7 = 20$.

$$n(S) = {}^{20}C_2 = (19 \times 20) / 2 = 190$$

Probability that both balls are white

$$n(E) = {}^7C_2 = (7 \times 6) / (1 \times 2) = 21$$

$$P(E) = n(E) / n(s) = 21/190$$

194. A can complete a given task in 24 days, while B is twice as efficient as he. A started on the work initially, and was joined by B after a few days. If the whole work was completed in 10 days, after how many days, from the time A started working, did B join A?

Answer:

A can complete the work in 24 days Efficiency of B is twice that of A.

B can complete the work in $24 \times (1/2) = 12$ days

According to the question, the work is completed in 10 days.

LCM of 24 and 12 = 24 units.

Let the total work be 24 units.

A can do in one day $(24/24) = 1$ unit

And B can do in one day = $24/12 = 2$ units

Now, A works for 10 days.

Total work done by A in 10 days = $10 \times 1 = 10$ units

Remaining work = $24 - 10 = 14$ units

Now, 14 units of work is done by B in $(14/2) = 7$ days

Hence B joined the work after $(10 - 7) = 3$ days

195. The angles of a quadrilateral are in the ratio of 9 : 8 : 12 : 7. The second largest angle of the quadrilateral is the part of a triangle, the base and hypotenuse of which are 15 cm and 17 cm respectively. What is the height of the triangle?

Answer:

Sum of angles of a quadrilateral = 360°

Let the angles be $9x, 8x, 12x$ and $7x$.

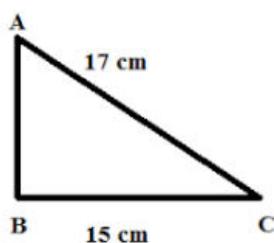
$$\text{Then, } 9x + 8x + 12x + 7x = 360^\circ$$

$$\text{or, } 36x = 360 \Rightarrow x = 10$$

$$\text{Thus, second largest angle} = 9 \times 10 = 90^\circ$$

Thus, the triangle is a right-angled triangle.

Now, ABC makes a right-angled triangle.



$$\text{Height of the triangle (AB)} = \sqrt{(AC)^2 - (BC)^2} = \sqrt{(17)^2 - (15)^2} = \sqrt{(289 - 225)} = \sqrt{64} = 8 \text{ cm}$$

196. When the price of rice was increased by 17% a family reduced its consumption in such a way that the expenditure on rice was 8% more than before. If 13 kg was consumed per month earlier, find the new monthly consumption.

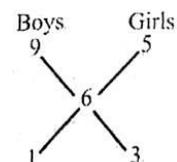
Answer:

$$\text{Reqd monthly consumption} = (108/117) \times 13 = 12 \text{ kg}$$

197. There are 52 students in a hostel. 312 toffees are distributed among them so that each boy gets 9 toffees and each girls gets 5 toffees. Find the number of boys and girls in that hostel.

Answer:

$$\text{Mean value of toffee per student} = 312/52 = 6 \text{ toffees}$$



$$\text{Boys : girls} = 1 : 3$$

$$\text{Number of boys} = [52 / (1+ 3)] \times 1 = 13$$

$$\text{And number of girls} = 52 - 13 = 39$$

198. The batting average of 40 innings of a cricket player is 70 runs. His highest score exceeds his lowest score by 170 runs. If these two innings are excluded, the average of the remaining 38 innings is 68 runs. What is his highest score?

Answer:

Let the highest score be x.

And the lowest score be y.

$$\text{Then, } x + y = 40 \times 70 - 38 \times 68 = 2800 - 2584 = 216$$

$$x+y=216$$

$$\text{Again, } x - y = 170 \text{ (ii)}$$

$$\text{Adding (i) and (ii), we get } (x+y=216) + (x - y=170) = 2x = 386$$

$$x = 386/2 = 193$$

$$y = 216 - 193 = 23$$

Therefore the highest score = 193

199. A water tank is 20m long, 12m wide and 30m deep. It is made up of iron sheet which is 2m wide. The tank is open at top. If the cost of the iron sheet is Rs.18 per metre, then what is the total cost of the iron sheet required to build the tank?

Answer:

Surface area of the open tank

$$= 2(l \times w + w \times d + l \times d) - (l \times w)$$

$$= 2[20 \times 12 + 12 \times 30 + 20 \times 30] - 20 \times 12$$

$$= 2[240 + 360 + 600] - 240$$

$$= 2400 - 240 = 2160\text{m}^2$$

$$\text{Length of iron sheet} = 2160/2 = 1080\text{m}$$

$$\text{Total cost of iron sheet} = 1080 \times 18 = \text{Rs.}19440$$

200. Pipe A can fill a cistern in 24 minutes and B in 36 minutes. If both the pipes are open together, after how long should pipe B be closed so that the cistern becomes full in 18 minutes?

Answer:

Let the capacity of the tank = LCM of 24 and 36 = 72

Now, Pipe A can fill the tank $(72/24=)$ 3 units in a minute

Pipe B can fill the tank $(72/36=)$ 2 units in a minute

Now, A fills the tank in 18 minutes = $(18 \times 3) = 54$ units

Remaining units = $72 - 54 = 18$ units

So, 18 units will be filled by B in $(18/2=)$ 9 minutes

201. A work which can be completed by 18 men in 26 days can also be done by 20 women in 33 days. 13 men start doing the work and complete one-third of the work. If they are now replaced by 22 women, in how many days the total work will be completed?

Answer:

18 m in 26 days, so 13 men do in $18 \times 26/13 = 36$ days. They complete $1/3$ rd of work. So number of days required by 13 men to complete that work is $36 \times 1/3 = 12$ days.

Now:

20 w in 33 days, so 22 w do in $20 \times 33/22 = 30$ days. They complete $2/3$ rd of work. So number of days required by 22 women to complete that work is $30 \times 2/3 = 20$ days.

So total $12 + 20 = 32$ days

202. A profit of Rs 1200 is made by selling an article if one-third of it is sold at 9% profit and the remaining at 3% loss. What is the cost price of the article?

Answer:

It can be calculated as:

$$CP = 1200 * 100 / [1/3 * 9 + 2/3 * (-3)] = 1,20,000$$

* 1/3rd sold at 9% profit, 2/3rd sold at 3% loss

203. There are 3 blue balls, 4 red, and 5 green balls. 3 balls are drawn at random. What is the probability of all blue or all green balls?

Answer:

$$\text{Probability of all blue} = {}^3C_3 / {}^{12}C_3 = 1/220$$

$$\text{Probability of all green} = {}^5C_3 / {}^{12}C_3 = 10/220$$

$$\text{So probability of all blue or all green} = 1/220 + 10/220 = 11/220$$

204. On a certain sum of money, compound interest obtained is Rs 3,520 after 2 years at 20% per annum. What will be the simple interest obtained at the same rate and for the same time.

Answer:

$$\text{If P is the principal, SI for 2 years} = P * 20 * 2 / 100 = 2P/5$$

$$\text{So, SI for 1 year} = P/5$$

$$\text{CI for 2 years} = P/5 + (P/5 + 20/100 * P/5) = 2P/5 + P/25 = 11P/25$$

$$\text{Now, } 11P/25 = 3520, \text{ so } P = 8,000$$

$$\text{So SI} = 2 * 8000 / 5 = 3200$$

205. A person whose monthly salary is Rs 10,000 has expenditure of Rs 6,000. In the next month, his salary increases by 10% and so he increases his expenditure by 20%. What is the percentage change in his savings made?

Answer:

$$\text{Savings} = 10,000 - 6000 = 4000$$

$$\text{Income becomes} = (110/100) * 10,000 = 11,000$$

$$\text{Exp. becomes} = (120/100) * 6,000 = 7,200$$

$$\text{So savings now} = 11000 - 7200 = 3800$$

$$\text{So \% decrease in savings} = (4000 - 3800) / 4000 * 100 = 5\%$$

206. A circle whose area is 3850 sq. cm has circumference double the perimeter of a rectangle of breadth 30 cm. Find the area (in sq cm) of rectangle.

Answer:

$$\pi r^2 = 3850, \text{ so } r = 35$$

$$\text{Now perimeter of rect.} = (1/2) * 2\pi r = 110$$

$$\text{So } 2(l+30) = 110, \text{ so } l = 25$$

$$\text{So area} = 25 * 30$$

207. There are 2 mixtures of milk and water such that mixture A contains 25% water and mixture B contains 10% water. Equal quantities of both mixtures are taken and put in a bottle. Find the final ratio of milk to water

Answer:

Let x litres taken from both,

$$\text{so milk : water} = 75\% \text{ of } x + 90\% \text{ of } x : 25\% \text{ of } x + 10\% \text{ of } x$$

208. Ratio of ages of A and B is 2 : 3 and that of A and C is 4 : 9. If the difference in the ages of B and C is 15 years, find the age of C.

Answer:

$$B/A = 3/2 \text{ and } A/C = 4/9$$

$$\text{So } B : A : C = 3 * 4 : 2 * 4 : 2 * 9 = 6 : 4 : 9$$

$$A = 6x, B = 4x, C = 9x$$

$$\text{So } 9x - 6x = 15, \text{ this gives } x = 5$$

$$\text{So age of C} = 9x = 45$$

209. An article which was sold for Rs 540 was marked at Rs 750. If two successive discounts were given with first being 20%, find the second discount given?

Answer:

$$\text{Total discount\% given} = (750 - 540) / 750 * 100 = 72\%$$

So by successive formula

$$-20 - x + (20 * x) / 100 = -72$$

210. Thirty men can complete a work in 16 days. They started work and after 6 days, ten more men joined. Find the number of days in which the remaining work will get completed?

Answer:

$$30 \text{ m in } 16 \text{ days, so } 40 \text{ men in } (30 * 16) / 40 = 12 \text{ days}$$

So

$$(1/16)*6 + (1/12)*x = 1$$

Solve, $x = 7.5$ days

211. Rajeev's age after 15 years will be 5 times his age 5 years back. What is the present age of Rajeev ?

Answer:

Let Rajeev's present age be x years. Then, Rajeev's age after 15 years = $(x + 15)$ years.

Rajeev's age 5 years back = $(x - 5)$ years.

Therefore $x + 15 = 5(x - 5)$

$$x + 15 = 5x - 25$$

$$4x = 40$$

$$x = 10.$$

Hence, Rajeev's present age = 10 years.

212. The ages of two persons differ by 16 years. If 6 years ago, the elder one be 3 times as old as the younger one, find their present ages.

Answer:

Let the age of the younger person be x years.

Then, age of the elder person = $(x + 16)$ years.

Therefore $3(x - 6) = (x + 16 - 6)$

$$3x - 18 = x + 10$$

$$2x = 28$$

$$x = 14.$$

Hence, their present ages are 14 years and 30 years.

213. The product of the ages of Ankit and Nikita is 240. If twice the age of Nikita is more than Ankit's age by 4 years, what is Nikita's age?

Answer:

Let Ankit's age be x years. Then, Nikita's age = $240/x$ years.

$$2 * (240/x) - x = 4$$

$$480 - x^2 = 4x$$

$$x^2 + 4x - 480 = 0$$

$$(x+24)(x-20) = 0$$

$$x = 20.$$

Hence, Nikita's age = $240/x = 240/20$ years = 12 years.

214. The present age of a father is 3 years more than three times the age of his son. Three years hence, father's age will be 10 years more than twice the age of the son. Find the present age of the father.

Answer:

Let the son's present age be x years. Then, father's present age = $(3x + 3)$ years

$$(3x + 3 + 3) = 2(x + 3) + 10$$

$$3x + 6 = 2x + 16$$

$$x = 10.$$

Hence, father's present age = $(3x + 3) = ((3 * 10) + 3)$ years = 33 years.

215. Rohit was 4 times as old as his son 8 years ago. After 8 years, Rohit will be twice as old as his son. What are their present ages?

Answer:

Let son's age 8 years ago be x years. Then, Rohit's age 8 years ago = $4x$ years.

Son's age after 8 years = $(x + 8) + 8 = (x + 16)$ years.

Rohit's age after 8 years = $(4x + 8) + 8 = (4x + 16)$ years.

$$2(x + 16) = 4x + 16$$

$$2x = 16 \Rightarrow x = 8.$$

Hence, son's present age = $(x + 8) = 16$ years.

Rohit's present age = $(4x + 8) = 40$ years.

216. One year ago, the ratio of Gaurav's and Sachin's age was 6: 7 respectively. Four years hence, this ratio would become 7: 8. How old is Sachin ?

Answer:

Let Gaurav's and Sachin's ages one year ago be $6x$ and $7x$ years respectively.

Then, Gaurav's age 4 years hence = $(6x + 1) + 4 = (6x + 5)$ years.

Sachin's age 4 years hence = $(7x + 1) + 4 = (7x + 5)$ years.

$$(6x+5) : (7x + 5) = 7 : 8$$

$$8(6x+5) = 7(7x + 5)$$

$$48x + 40 = 49x + 35$$

$$x = 5.$$

Hence, Sachin's present age = $(7x + 1) = 36$ years.

217. Abhay's age after six years will be three-seventh of his father's age. Ten years ago the ratio of their ages was 1: 5. What is Abhay's father's age at present?

Answer:

Let the ages of Abhay and his father 10 years ago be x and $5x$ years respectively.

Then, Abhay's age after 6 years = $(x + 10) + 6 = (x + 16)$ years.

Father's age after 6 years = $(5x + 10) + 6 = (5x + 16)$ years.

$(x + 16) : (5x + 16) = 3 : 7$

$7(x + 16) = 3(5x + 16)$

$7x + 112 = 15x + 48$

$8x = 64 \Rightarrow x = 8.$

Hence, Abhay's father's present age = $(5x + 10) = 50$ years.

218. The Ratio of Ages of Mona and Sona is 4:5. Twelve Years hence, their ages will be in the ratio of 5:6. What will be Sona's age after 6 years ?

Answer:

Let their present ages be $4x$ & $6x$

Then $(4x + 12)/(6x + 12) = 5/6$ or $x=12$

Sona's age after 6 years = $(6x + 6) = 66$ years

219. Ramu was 4 times as old as his son 8 years ago. After 8 years, Ramu will be twice as old as his son. What their present ages ?

Answer:

Let son's age 8 years ago be x years

Then Ramu's age at that time = $4x$ years

Son's age after 8 years = $(x + 8) + 8 = (x + 16)$ years

Ramu's age after 8 years = $(4x + 8) + 8 = (4x + 16)$ years

$2(x + 16) = 4x + 16$ or $x=8$

Son's present age = $(x + 8) = 16$ years

Ramu's present age = $(4x + 8) = 40$ years

220. A man is four times as old as his son. Five years ago, the man was nine times as old his son was at that time. What is the present age of a man ?

Answer:

Let son's age = x , then man's age = $4x$.

$9(x - 5) = (4x - 5)$ or $x=8$.

Man's present age = $(4x + 7) = 35$ years

221. 1. The average of 8 numbers is 20. The average of first two numbers is $31/2$ and that of the next three is $21\frac{1}{2}$. If the sixth number is less than seventh and eighth number by 4 and 7 respectively, then eighth number is?

Answer:

Let the eighth number be x . Then, sixth number = $x - 7$

Seventh number = $(x - 7) + 4$

So, $(2 \times 31/2) + (3 \times 21\frac{1}{2}) + (x - 7) + (x - 3) + x = 8 \times 20$

Or, $x = 25$

222. The price of a car is Rs.3,25,000. It was insured to 85% of its price. The car was damaged completely in an accident and the insurance company paid 90% of the insurance. What was the difference between the price of the car and the amount received?

Answer:

Amount paid to the card owner = 90% of 85% of 325000 = Rs.248625

So, the required difference = Rs. (325000 - 248625) = Rs. 76375

223. Three containers have their volumes in the ratio 3:4:5. They are full of mixtures of milk and water in the ratio (4:1), (3:1) and (5:2) respectively. The contents of all these buckets are poured into a fourth container. The ratio of milk and water in the fourth container is?

Answer:

Let the containers contain $3x$, $4x$ and $5x$ litres of mixture respectively

Milk in first mix = $(3x \times 4/5) = 12x/5$ litres

Water in first mix = $(3x - 12x/5) = 3x/5$ litres

Milk in second mix = $(4x \times 3/4) = 3x$ litres

Water in second mix = $(4x - 3x) = x$ litres

Milk in third mix = $(5x \times 5/7) = 25x/7$ litres

Water in third mix = $(5x - 25x/7) = 10x/7$ litres

Total milk in final mix = $314x/35$ litres

Total water in final mix = $106x/35$ litres

Required ratio of milk and water = $314x/35 : 106x/35 = 157:53$

224. Two pipes A and B can fill a tank in 48min and 16min respectively. If both the pipes are opened simultaneously, after how much time B should be closed so that the tank is full in 18 minutes?

Answer:

let B be closed after x min

Then, part filled by A+B in x min+part filled by A in (18-x)min=1

$$x(1/48+1/16)+(18-x) \times 1/48=1$$

or, x=10

225. The speed of a train in the onward journey is 25% more than that in the return journey. The train halts for 1hour on reaching the destination. The total time taken for the total to and fro journey is 17 hours, covering a distance of 800km. The speed of the train in the onward journey is ?

Answer:

let the speed in return journey be x kmph

Then speed in onward journey = $125x/100=5/4x$ kmph

Average speed= $10x/9$ kmph

Therefore, $800 \times 9/10x=16$

So, x=45kmph

So, speed in onward journey= $(5/4 \times 45)=56.25$ kmph

226. A train running at a 54kmph takes 20seconds to pass a platform. Next it takes 12seconds to pass a man walking at 6kmph in the same direction in which the train is going. Find the length of the train and the length of the platform?

Answer:

let the length of the train be x mt and the length of the platform be y mt.

Speed of the train relative to man= $54-6=48$ kmph or $40/3$ m/s

In passing a man, train covers its own length with relative speed

So, length of the train =Relative speed \times time= $40/3 \times 12=160$ m

Also, speed of the train= $54 \times 5/18=15$ m/s

Therefore, $x+y/15=20$

Or, y=140m

227. Speed of boat in the standing water is 9kmph and the speed of stream is 1.5kmph. A man rows to a place to a distance of 105km and comes back to the starting point. The total time taken by the man is?

Answer:

speed upstream=7.5kmph

Speed downstream=10.5kmph

Therefore, total time taken= $(105/7.5+105/10.5)$ hrs. = 24hrs

228. A jar full of whisky contains 40% alcohol. A part of this whisky is replaced by another containing 19%alcohol and now the percentage of alcohol was found to be 26%. The quantity of whisky replaced is?

Answer:

Since strength of the first jar=40%

Strength of second jar= 19%

Mean strength =26%

So, using the rule of allegation, the ratio between the two quantities is=7:14=1:2

Therefore, required quantity replaced is=2/3

229. 8litres are draw from a cask full of wine and replaced with water. This operation is performed three more times. The ratio of quantity of wine now left in the cask to that of water is 16:65. How much wine did the cask hold originally?

Answer:

let the qty of wine in the cask originally be = x litres

Then, quantity of cask left in the wine after 4 operations= $[x (1-8/4)^4]$ litres

Therefore, $x (1-8/4)^4/x=16/81 \Rightarrow x=24$

230. What annual installment (in approximate figure) will discharge a debt of Rs.2000 due in 3 years at 15% simple interest?

Answer:

let each installment be Rs. X

So, $[x+x \times 15/100] + [x+x \times 15 \times 2/100] + x=2000$

Solving we get $x \sim$ Rs.580

231. In a 20 km Tunnel connecting 2 villages X and Y, there are three gutters. The distance between gutters 1 and 2 is half the distance between gutters 2 and 3. The distance from village X to its nearest gutter, gutter 1 is equal to the distance of Village Y from gutter 3. On a particular day, the hospital in village X receives information that an accident has happened at the third gutter. The victim can be saved only if an operation is started within 40 minutes. An ambulance started from village X at 30 kmph and crossed the first gutter after 5 minutes. If the driver had

236. A train travels for 7 hours at the speed of 27 km/hr. and for 9 hours at the speed of 38 km/hr. At the end of it driver finds he has covered 3/7th of total distance. At what speed the train should travel to cover the remaining distance in 24 hours?

Answer:

Let the total distance is 'x' = $3x/7 = (7 \times 27) + (9 \times 38) = 531$

$x = (531 \times 7)/3 = 1239$ km.

Remaining distance = $1239 - 531 = 708$ km.

Speed = $(708/24) = 29.5$ km/hr

237. How many different words can be formed with the letters of the word "TRANSFER" so that the words begin with 'T'?

Answer:

First letter 'T' is fixed, so remaining '7' letters can be filled in $7!/2$ ways as the letter 'R' comes twice.

Total arrangements = $7!/2 = 2520$

238. A bag contains 5 black and 3 white balls. A second bag contains 4 black and 2 white balls. One bag is selected at random. From the selected bag one ball is drawn. What is the probability that the drawn ball is black ?

Answer:

Probability of selecting first bag = $1/2$ and probability of drawn ball is black is $5c_1 / 8c_1 = 5/8$

$P(E_1) = (1/2) \times (5/8)$, similarly $P(E_2) = (1/2) \times (4/6)$

$P(E) = (5/16) + (1/3) = (15+16)/48 = 31/48$

239. Two pipes 'A' and 'B' would fill a tank in 36 hours and 45 hours respectively. If both pipes are opened together, find when the first pipe must be closed so that the tank may be just filled in 30 hours ?

Answer:

Let the first pipe is closed after 't' hours.

$(t/36) + (30/45) = 1$, $(t/36) = 1 - (2/3) = 1/3$

$t = 36 \times (1/3) = 12$ hours.

240. A shopkeeper buys 5 tables and 8 chairs for Rs.5000. He sells the tables at a profit of 12% and chairs at a loss of 8%. If his total gain is Rs.80 then what price does he pay for a table and a chair ?

Answer:

Let the price of a table is 'x' and chair is 'y'

$5x + 8y = 5000$ _____ (I)

12% of $5x = 5x \times (12/100) = 3x/5$

and 8% of $8y = (16y/25)$

$= (3x/5) - (16y/25) = 80$

$15x - 16y = 2000$ _____ (II)

Solving equn (I) and (II) $x = 480$ and $y = 325$

241. Population of a city is 1.2 lakh. If the population of male increases by 5% and the female by 10%, the population will be 1.2835 lakh. What is the number of female in the city ?

Answer:

Let the population of female is 'x'.

Population of male = $1.2 - x = (110x/100) + [(105/100) (1.2 - x)] = 1.2835$

$110x + 126 - 105x = 128.35$

$5x = 128.35 - 126 = 2.35$

$x = (2.35/5) = 0.47$ lakh = 47000

242. A shopkeeper marks his goods 20% above the cost price but give 11% discount on it. If he sells the article for Rs.1575.30 then what is the cost price ?

Answer:

Let the cost price is 'x'

$x \times (120/100) \times (89/100) = 1575.3$

$x = (157530 \times 100) / (120 \times 89) = 1475$

243. If Rs. 6200 amounts to Rs. 8804 in 3 years 6 months, what will Rs. 7800 amount to in 4 years 6 months at the same rate percent per annum ?

Answer:

S.I. = $8804 - 6200 = 2604$

$r = (2604 \times 100) / (6200 \times 3.5) = 12\%$ p.a

Now for Rs. 7800, S.I. = $(7800 \times 4.5 \times 12)/100 = 4212$

Req. amount = $7800 + 4212 = 12012$

244. The compound interest on a certain sum of money for two years at 8% p.a. is Rs. 499.20. What will be the simple interest at the same rate and for the same time period ?

Answer:

$$P[1 + (8/100)]^2 - P = 499.20$$

$$P(27/25)^2 - P = 499.20$$

$$P(729-625) / 625 = 499.20$$

$$P = (499.20 \times 625) / 104 = 3000$$

$$S.I = (3000 \times 8 \times 2) / 100 = 480$$

245. Certain number of persons can do a work in 50 days. If there were 7 persons more the work could be finished in 14 days less. How many persons were there initially ?

Answer:

Let the original number of men 'x'

7 person (50 - 14 = 36) days work = x persons 14 days work

$$x = (7 \times 36) / 14 = 18$$

246. Find the area of a circle whose radius is equal to the side of an equilateral triangle of area $9\sqrt{3} \text{ cm}^2$ (find approximate area)-

Answer:

$$\text{area of equilateral } \Delta = \sqrt{3}/4 \times x^2$$

where, (x = side)

$$\sqrt{3}/4 \times x^2 = 9\sqrt{3}$$

$$x^2 = 36$$

$$x = 6$$

à x = 6 cm.

à area of circle = πr^2 , (where, r = x)

$$\pi \times 6^2 = 113.04$$

247. In an election between two candidates, one got 55% of the total valid votes, 20% of votes were invalid. If the number of votes was 7500, what was the number of valid votes, 2nd candidate got?

Answer:

$$\text{Valid votes} = 80\% \text{ of } 7500 = 6000$$

$$\text{2nd candidates got} = 45\% \text{ of } 6000 = 2700$$

248. A bag contains 2 yellow, 3 green and 2 blue balls. Two balls are drawn at random, what is the probability that none of the balls drawn is blue?

Answer:

$$\text{Total Balls} = 2+3+2 = 7$$

2 balls drawn should not be blue à except blue, total is 5, so 5C_2 out of total 7C_2

$$\text{so required probability} = ({}^5C_2) / ({}^7C_2) = 10/21$$

249. The ratio of height and diameter of a cylinder is 2 : 3. Find the ratio of its volume and curved surface area of radius 6 cm?

Answer:

$$h:d = 2:3 \Rightarrow h:2r = 2:3$$

$$\Rightarrow h/12 = 2/3 = 8$$

$$\Rightarrow \text{Volume/C.S.A} = (\pi r^2 h) / (2\pi r h)$$

$$\Rightarrow 6/2 = 3/1 \text{ or } 3:1$$

250. How many bricks are needed to complete a wall 15 m × 12 m × 10 cm. using bricks 24 cm × 25 cm × 10 cm. thick if 1/3 rd of the wall is already built?

Answer:

$$(1500 \times 1200 \times 10) / (24 \times 25 \times 10) = 3000$$

$$\text{Since } 1/3 \text{ rd is built, so required bricks} = (2/3) \times 3000 = 2000$$