Ages:

* age is used as a reference point to measure an individual's progress or development
* Age can also be used to compare the performance of different individuals
* age may also be used to determine eligibility

Problems based on age:

1.The sum of the ages of a father and his son is 48 years. Four years ago, the father was five times as old as his son. What are their current ages?

Solution:

Let the age of son be x years.

The current age of the father is (48 - x) years.

Four years ago,

The father's age was (48 - x - 4) years

The son's age was (x - 4) years.

The equation is as follows,

(48 - x - 4) = 5(x - 4)

48 - x - 4 = 5x - 20.

44 – x = 5x – 20

44 + 20 = 5x + x

64 = 6x

X = 10.67

The fathers age is

48 – x

48 – 11

37

Hence the fathers age is 37 and the son’s age is 11

2. The average age of a group of 10 friends is 30 years. One of the friends, who is 40 years old, leaves the group. What is the new average age of the group?

Solution:

The sum of the ages of the 10 friends is

10 \* 30 = 300 years

When one friend leaves, the sum of ages becomes 300 - 40 = 260 years.

The new average age of the group is

260 / 9 ≈ 28.89 years

3. The ratio of the present ages of A and B is 5:8. If the difference between their ages is 6 years, what are their current ages?

Solution:

Let the present ages be

A = 5x and B = 8x.  
 According to the given information,

8x - 5x = 6

3x = 6

Dividing both the side by 3,

we get x = 2.

A = 5x

A = 5 \* 2 = 10 years

B = 8x

B = 8 \* 2 = 16 years

Therefore, the current age of A is 10 years, and the current age of B is 16 years.

4. The sum of the ages of a brother and sister is 30 years. Five years ago, the brother was three times as old as his sister. What are their current ages?

Solution:

Let the current age of the sister be x years.

The current age of the brother is (30 - x) years.

Five years ago,

The brother's age was (30 - x - 5) years

The sister's age was (x - 5) years.

According to the given information,

(30 - x - 5) = 3(x - 5).

25 - x = 3x - 15.

25 + 15 = 3x + x

40 = 4x

x = 10.

Therefore, the current age of the sister is 10 years, and the brother is 30 - 10 = 20 years.

Question 5: The ages of a father and son add up to 60 years. Four years ago, the father was three times as old as his son. What are their current ages?

Solution:

Let the current age of the son be x years.

The current age of the father is (60 - x) years.

Four years ago,

The father's age was (60 - x - 4) years

The son's age was (x - 4) years.

According to the given information,

(60 - x - 4) = 3(x - 4)

56 - x = 3x – 12

56 + 12 = 3x + x

68 = 4x

X = 17

Therefore, the current age of the son is 16 years, and the father is 60 - 17 = 43 years.

Percentage:

* Percentage is a way of expressing a part of a whole as a number between 0 and 100.
* percentages are often used to compare the performance of different individuals
* Percentages can also be used to set standards or benchmarks.

Problems based on percentage:

1.40% of Nicke’s income is Rs.1200. Then find the following

I. 75% of income?

II. ¼ part of income ?

Solution:

40% of nicke’s income = 1200

40% of x = 1200

40/100 \* x = 1200

X = 1200 \* 100/40

X = 3000

1. 75% of x = ?

75 / 100 \* x = ?

Sub x = 3000 here ,

75/100 \* 3000 = 2250

Hence 75% of income is 2250

II. ¼ of x = ?

¼ \* 3000 = 750

2. if peter is 25% more than Delson, then how much % Delson's salary is higher than that of peter.

Solution:

Peter is 25% more than Delson hence we use the formula.

Formula : [ R / (R+ 100) ] \* 100

= [25 / (25+100)] \* 100

= 25/ 125 \* 100

Hence 20% Delson's salary is less than that of the peter.

3. if john’s salary is 25% increased and decreased by 25%. How much % decreased in final salary.

Solution:

Increased % of john’ s salary = 25%

Decreased % of john’s salary = 25%

As increased and decreased % of john’s salary same we use the formula as follows,

Formulae: r2 / 100

= ( 25 ) 2/ 100

= 125/20

= 6.25 %

4. population of goa is 30,000. If it increases at the rate of 5% per annum what will be its population after 2 years ?

Solution:

The current population of goa = 30,000

So to calculate the population after 2 years we use the formula as follow,

Formula: after ‘n’ years = P \* (1 + (R / 100) ) n

Where p = 30,000 , R = 5% , and n = 2 years

Substitute the given data in the above formula,

= 30000 \* ( 1+ (5/100))2

= 30 \* 1000 \* (105/100)2

= 30 \* 1000 \* 21/20 \* 21 / 20

= 75 \*441

= 10,800

To get the population after 2 years , 10,800+30,000 = 40,800

Hence the population after two years is 40,800

5. A supermarket sold 5kg more sugar for 100 Rs. As the price of sugar has decreased by 10%. Find the actual price of sugar?

As the consumption is increased and the of the sugar is decreased we use the formula as follows,

Formula: [ R/(100-R) ] \* 100

Let us consider the price as y and kg as x and price / kg = 100/5

Where R = 10 %

= [10/(100-10)] \* (100/ 5)

= [10/90]\*20

= 20/9 = 2 9/2 price/kg

The actual price of sugar is 2 9/2

Profit/loss:

The basic concepts of profit and loss are as follows:

* Cost price (C.P.): It is the price at which an item is purchased.
* Selling price (S.P.) It is the price at which an item is sold.
* Profit or Gain: If S.P. is greater than C.P., the seller is said to have a profit or gain.
* Loss: If S.P. is less than C.P., the seller is said to have incurred a loss.

Problems based on profit/loss:

1. Alfred buys an old scooter for Rs. 4700 and spends Rs. 800 on its repairs. If he sells the scooter for Rs. 5800, what is his gain percent?

Solution:

Cost Price (C.P.) = Rs. (4700 + 800) = Rs. 5500.

Selling Price (S.P.) = Rs. 5800.

Gain = (S.P.) - (C.P.) = Rs. (5800 - 5500) = Rs. 300.

Gain% = (gain \* 100)/ C.P

Gain% = (300/5500 \* 100) %

Gain% = 5 (5/11) %

2. A shopkeeper buys an item for $50 and sells it for $70. What is the profit percentage?

Solution:

Profit = Selling Price - Cost Price Profit = $70 - $50 = $20

Profit percentage = (Profit / Cost Price) x 100

Profit percentage = ($20 / $50) x 100 = 40%

The profit percentage is 40%.

3. A company sells a product at a 25% profit. If the cost price of the product is $80, what is the selling price?

Solution:

Profit = (Profit percentage / 100) x Cost Price

Profit = (25 / 100) x $80 = $20

Selling Price = Cost Price + Profit Selling Price

= $80 + $20 = $100

The selling price is $100.

4. A trader sells an item at a 10% loss. If the selling price is $90, what is the cost price?

Solution:

Loss = (Loss percentage / 100) x Selling Price

Loss = (10 / 100) x $90

= $9

Cost Price = Selling Price - Loss Cost Price

= $90 - $9 = $81

The cost price is $81.

5. A shopkeeper sold an item at a 20% loss. If the selling price was $160, what was the cost price?

Solution:

Loss = (Loss percentage / 100) x Selling Price

Loss = (20 / 100) x $160

= $32

Cost Price = Selling Price + Loss

Cost Price = $160 + $32

= $192

The cost price was $192.

Distance :

* Distance is a measure of how far apart two objects are
* Distance represents the total length or extent covered by an object or individual during a specific period.
* Distance is often used in conjunction with other variables such as speed or time to calculate unknown quantities

Problems based on train:

1. Two trains, A and B, are traveling towards each other on parallel tracks. Train A is moving at a speed of 80 km/h, and Train B is moving at 60 km/h. If the distance between them is 500 km, how long will it take for them to meet?

Solution:

The relative speed of Train A and Train B is 80 km/h + 60 km/h = 140 km/h.

Time = Distance / Speed Time

= 500 km / 140 km/h Time

= 3.57 hours or 3 hours and 34 minutes.

It will take approximately 3 hours and 34 minutes for the two trains to meet.

2. Train A traveling at a speed of 60 km/h crosses a platform in 40 seconds. The length of the train is 250 meters. What is the length of the platform?

Solution:

Train A crosses a platform at a speed =60 km/hr

the total distance covered = length of the train + length of the platform.

Speed = Distance / Time 60 km/h

= (250 meters + Length of the platform) / 40 seconds

Converting km/h to m/s:

60 km/h = 60,000 meters / 3600 seconds

= 16.67 m/s

16.67 m/s = (250 meters + Length of the platform) / 40 seconds

Length of the platform = (16.67 m/s × 40 seconds) - 250 meters

Length of the platform = 666.8 meters - 250 meters Length of the platform

= 416.8 meters

The length of the platform is 416.8 meters.

3. Two trains, A and B, are traveling in the same direction on parallel tracks. Train A overtakes Train B in 6 hours. Train A is traveling at a speed of 80 km/h, while Train B is traveling at 60 km/h. What is the difference in their lengths if Train B is 300 meters long?

Solution:

When one train overtakes another traveling in the same direction, the relative speed between them is the difference of their speeds.

The relative speed of Train A and Train B is 80 km/h - 60 km/h = 20 km/h.

Time = Distance / Speed 6 hours = (Length of Train A - Length of Train B) / 20 km/h

Converting 20 km/h to m/s:

20 km/h = 20,000 meters / 3600 seconds

= 5.56 m/s

6 hours = (Length of Train A - 300 meters) / 5.56 m/s

Length of Train A = (6 hours × 5.56 m/s) + 300 meters

Length of Train A = 33.33 m/s + 300 meters

Length of Train A = 333.33 meters

Difference in their lengths = Length of Train A - Length of Train B

Difference in their lengths = 333.33 meters - 300 meters

Difference in their lengths = 33.33 meters

The difference in their lengths is 33.33 meters.

4. A train traveling at a speed of 100 km/h crosses a pole in 15 seconds. What is the length of the train?

Solution: The length of the train is equal to the distance covered during the time it takes to cross the pole.

Speed = Distance / Time 100 km/h = Distance / 15 seconds

Converting km/h to m/s: 100 km/h = 100,000 meters / 3600 seconds = 27.78 m/s

27.78 m/s = Distance / 15 seconds

Solving for Distance (length of the train): Distance = 27.78 m/s × 15 seconds Distance = 416.7 meters

The length of the train is 416.7 meters.

5. A train travels at a speed of 90 km/h for 2 hours and then reduces its speed to 60 km/h for the next 3 hours. What is the average speed of the train for the entire journey?

Solution:

Average speed = total distance covered / total time taken.

Distance traveled at 90 km/h = Speed × Time

= 90 km/h × 2 hours

= 180 km

Distance traveled at 60 km/h = Speed × Time

= 60 km/h × 3 hours

= 180 km

Total distance = 180 km + 180 km

= 360 km

Total time = 2 hours + 3 hours

= 5 hours

Average speed = Total distance / Total time

= 360 km / 5 hours

= 72 km/h

The average speed of the train for the entire journey is 72 km/h.