

Q. A primary school had an enrollment of 850 pupils in Jan 2022. In Jan 2023 enrollment was 1120. What was increase in percentage for enrollment

Given Data:

School enrollment in 2022 = 850 pupils

School enrollment in 2023 = 1120 pupils.

Increase in number = $1120 - 850$
270 pupils.

Increase in percentage = ?

Solution:

$$\text{Percentage Increase} = \frac{\text{Increase in number} \times 100}{\text{Initial number}}$$

$$\text{Percentage Increase} = \frac{270}{850} \times 100$$

$$= \frac{27 \times 100}{85} = \frac{27}{17} \times 20$$

$$= \frac{540}{17}$$

$$\text{Percentage Increase} = 31.76\%$$

Increase in percentage for enrollment in Jan 2023 = 31.76%

A man is 5 times as old as his son, two years ago the sum of squares of their ages was 114. Find the present age of his son.

Given Data:

$$\text{Age of father} = 5x$$

$$\text{when son's age} = x$$

Condition 1: 2 years ago.

$$(\text{Son's age} - 2)^2 + (\text{Father's age} - 2)^2 = 114$$

Solution:

$$(x - 2)^2 + (5x - 2)^2 = 114 \quad \text{--- (i)}$$

$$\text{As } (a - b)^2 = a^2 + b^2 - 2ab$$

$$\text{So, } (x - 2)^2 = x^2 + 2^2 - 2(x)(2)$$

$$= x^2 + 4 - 4x \quad \text{--- (a)}$$

$$(5x - 2)^2 = 5x^2 + 2^2 - 2(5x)(2)$$

$$= 5x^2 + 4 - 20x \quad \text{--- (b)}$$

Putting (a) and (b) in equation (i)

$$(x^2 + 4 - 4x) + (5x^2 + 4 - 20x) = 114$$

$$x^2 + 4 - 4x + 5x^2 + 4 - 20x = 114$$

$$26x^2 + 8 - 24x = 114$$

$$26x^2 - 24x = 114 - 8$$

$$26x^2 - 24x = 106$$

$$26x^2 - 24x - 106 = 0 \quad \text{--- (ii)}$$

Mid term breaking of eq

Dividing eq (ii) by common factor 2.

$$26x^2 - 24x - 106 = 0$$

$$= 13x^2 - 12x - 53 = 0$$

$$a = 13, \quad b = -12, \quad c = -53$$

Putting in quadratic equation.

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

$$x = \frac{-(-12) \pm \sqrt{+(-12)^2 - 4(13)(-53)}}{2(13)}$$

$$x = \frac{+12 \pm \sqrt{144 - (-2756)}}{26}$$

$$x = \frac{+12 \pm \sqrt{144 + 2756}}{26}$$

$$x = \frac{+12 \pm \sqrt{2900}}{26}$$

$$x = \frac{+12 \pm 53.85}{26}$$

$$x = \frac{12 + 53.85}{26}$$

$$= \frac{65.85}{26}$$

$$= \frac{65.85}{2600} = 9.53$$

$$x = \frac{12 - 53.85}{26}$$

$$x = \frac{-41.85}{26}$$

$$x = \frac{41.85}{2600} = -1.60$$

	R.W	
	13	
10765	4	
x	52	
53825	x 53	
	156	
	260x	
	2756	
	144	
5	2900	53.85
	25	102
103	400	204
	309	104
		16
1068	9100	103
	8544	2
		309
10765	55600	
	53825	
	1065	
	1775	
	5325	
	8	
	1069	
	9	
	621	
	1068	
	8	
	41	1544
	6585	
	2600	

$$x = 2.53$$

$$\text{or } x = -1.60$$

As, age can't be a negative value so,

$x = 2.53$ is son's age.

$5x = 12.65$ is Father's age.

A man has some hens and cows if the no. of heads be 48 and no of feet is equal to 140, find no. of hens.

Data:

Hens feet = 2 in no.

Cows's Feet = 4 in no.

No. of head's present in farm = 48.

No. of feet present = 140.

Solution:

Condition 1

Data:

Man has hens = x

Man has cows = y

Condition 1: $x + y = 48$ heads. —(i)

Condition 2: $2x + 4y = 140$ feet. —(ii)

Solution:

$$x + y = 48$$

$$2x + 4y = 140.$$

Dividing eq (ii) by 2.

$$x + 2y = 70 \quad - \text{ (iii)}$$

Subtracting eq (i) by eq (iii)

$$\begin{array}{r} x + 2y = 70 \\ + x + y = 48 \\ - \quad - \quad - \\ \hline \quad \quad y = 22 \end{array}$$

$$\boxed{y = 22.}$$

Putting value of y in eq (ii)

$$2x + 4(y) = 140$$

$$2x + 4(22) = 140$$

$$2x + 88 = 140$$

$$2x = 140 - 88 \quad (\text{Subtracting both sides by } 88)$$

$$2x = 52$$

$$x = \frac{52}{2} = 26$$

$$\boxed{x \text{ is } 26.}$$

Checking by putting value of x and y in eq (i) & (ii)

$$x + y = 48$$

$$26 + 22 = 48$$

$$48 = 48$$

$$2x + 4y = 140$$

$$2(26) + 4(22) = 140$$

$$52 + 88 = 140$$

$$140 = 140$$

**Thus, Man has 26 hens
and he has 22 cows**

A car runs at a speed of 40 km/h driving first half of the journey and at the speed of 60 km/h in 2nd half of journey. What is average speed of car?

Data:

Speed in 1st half = 40 km/h

Speed in 2nd half = 60 km/h

Average speed during journey = x

Formula:

$$\text{Average} = \frac{\text{Sum of values}}{\text{No. of values.}}$$

Solution:

$$\text{Average speed} = \frac{40 + 60}{2}$$

$$= \frac{100}{2}$$

$$= 50 \text{ km/h}$$

Average speed during journey = 50 km/h.

A number is divided by ~~50~~ 6 and then 50 is added. If the total is 60, What is the number?

Data:

Number = x .

$$\text{Condition} = \frac{x}{6} + 50 = 60.$$

Solution:-

$$\frac{x}{6} + 50 = 60$$

Taking LCM of

$$\frac{x + (50)(6)}{6} = 60$$

$$x + 300 = \cancel{360} 360$$

$$x = 360 - 300$$

$$x = 60$$

Checking

$$\frac{x}{6} + 50 = 60$$

$$\frac{60}{6} + 50 = 60$$

$$60 + 300 = 60$$

$$360 = 360$$

Solution:

$$\frac{x}{6} + 50 = 60$$

Taking LCM.

$$\frac{x + (50 \times 6)}{6} = 60$$

$$\frac{x + 300}{6} = 60$$

Multiplying both sides by 6

$$6 \times \frac{x + 300}{6} = 60 \times 6$$

$$x + 300 = 360$$

Subtracting both sides by 300.

$$x + 300 - 300 = 360 - 300$$

$$\boxed{x = 60} \quad \text{The number is 60}$$

Checkings:

$$\frac{x}{6} + 50 = 60 \quad ; \quad \frac{60 + 300}{6} = 60$$

$$360 = 360.$$

Find the odd one out

8, 16, 24, 34, 40, 48

All the numbers are multiples of 8.
except 34.

Checking.

$$8 \times 1 = 8$$

$$8 \times 2 = 16$$

$$8 \times 3 = 24$$

$$8 \times 5 = 40$$

$$8 \times 6 = 48$$

Hence, 34 is odd one As

34 is not divisible by 8.

A tower is 15 m tall. If I am standing
20 m from the base of the tower.

What is my aerial distance from the top
of the tower?

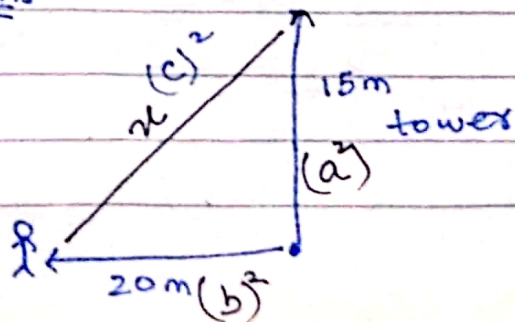
Data.

Length of tower = 15 m

Distance between tower and person = 20 m.

Aerial distance from top of tower = ?

Graphical Representation:



As, tower is perpendicular to the distance between man and tower

So,

Formula:

$$\text{Pythagoras theorem} = a^2 + b^2 = c^2$$
$$= (\text{perpendicular})^2 + (\text{Base})^2 = (\text{Hypotenuse})^2$$

Solutions:

$$(\text{Distance})^2 = \text{length}^2$$
$$(\text{Distance})^2 + (\text{length of tower})^2 = (\text{Aerial distance})^2$$

$$(15)^2 + (20)^2 = (x)^2$$

$$225 + 400 = x^2$$

$$625 = x^2$$

Taking square root to find x .

$$\sqrt{625} = \sqrt{x^2}$$

$$\sqrt{5 \times 5 \times 5 \times 5}$$
$$\sqrt{5^2 \times 5^2}^{1/2}$$

$$5 \times 5 = x$$

$$25 = x$$

25m is the aerial distance between from the top of the tower

In a hotel, the tariff for every odd dates is 1000 Rs and for every even day is 2000. If man paid total of 30000 in all. For how many days did he stay in the hotel given the first day is 5th day of man.

Data:

Tariff for every odd day = 1000

Tariff for every even day = 2000

Odd day = $x \times 1000$

even day = $y \times 2000$

Condition:

$$x + y = 30000$$

Solution: $1000x + 2000y = 30000$

$$3000x = 30000$$

Dividing both sides by 3000

$$\frac{3000x}{3000} = \frac{30000}{3000}$$

$$x = 10$$

$$1000x + 2000x = 30000$$

Odd days = x $5 - 25 = 10000$

If he starts from 5th day of month

then $5 - 23 = 10$ odd days. = $1000 \times 10 = 10000$

And $6 - 24 = 10$ even days = $2000 \times 10 = 20000$
Total = 30000