

Maths

Time

Till of some anything based on



0  
1  
2  
3  
.  
.  
.  
.  
10

Frequency

no. of 2000's (0)

no. of 2000's (5)

Tally marks

Tally marks	Frequency
	5
	3

2. The marks (out of 10) obtained by 28 students in a Mathematics test are listed as below:

8, 1, 2, 6, 5, 5, 5, 0, 1, 9, 7, 8, 0, 5, 8, 3, 0, 8, 10, 10, 3, 4, 8, 7, 8, 9, 2, 0

The number of students who obtained marks more than or equal to 5 is

(A) 13 (B) 15 (C) 16 (D) 17

Solution:-

(D) 17

First we have to arrange the marks (out of 10) obtained by 28 students in a Mathematics test.

0, 0, 0, 0, 1, 1, 2, 2, 3, 3, 4, 5, 5, 5, 5, 6, 7, 7, 8, 8, 8, 8, 8, 8, 9, 9, 10, 10.

The number of students who obtained marks more than or equal to 5 is 17.

3. In question 2 above, the number of students who scored marks less than 4 is

(A) 15 (B) 13 (C) 12 (D) 10

Tally marks | frequency

Average

Average (Mean of Avg)

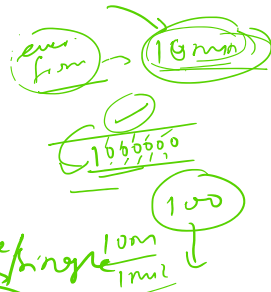
Students

K	A	B	C	D	E	F
12	13	15	20	13	17	20

Average of in your

precise the value of one of individual each

quantity in a group

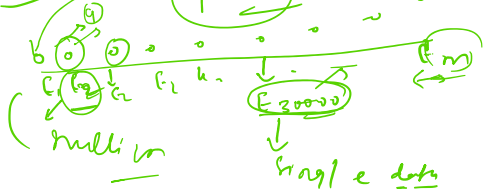


syb

This only of avg.

(15)

(avg)

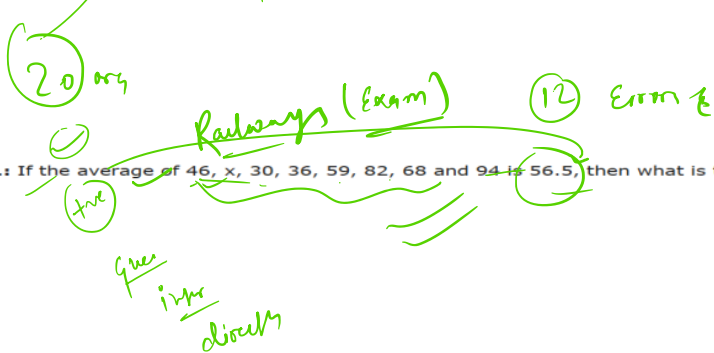
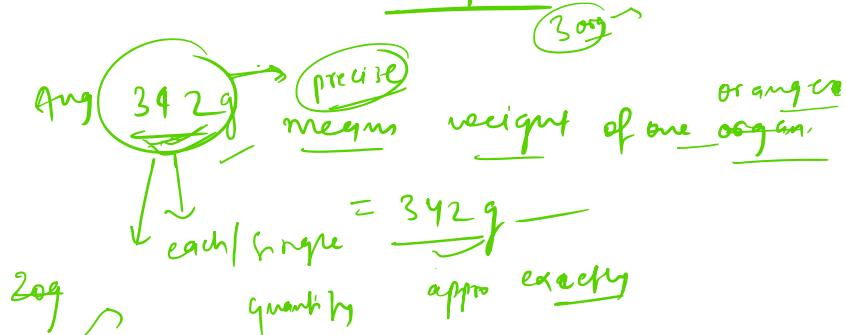


precise the mean value of quantity in a group

$$\text{Avg} = \frac{\text{sum of values}}{\text{no. of values}} / \frac{\text{sum of quantity}}{\text{no. of quantity}}$$

we weighed 3 oranges in a box of twenty oranges  
and found these were 335g, 320g, 371g

Calculate avg weight of 3 oranges



**Question 1:** If the average of 46, x, 30, 36, 59, 82, 68 and 94 is 56.5, then what is the value of x?

- a) 40
- b) 37
- c) 29
- d) 23

$$56.5 \text{ (Avg)} = \frac{46 + x + 30 + 36 + 59 + 82 + 68 + 94}{8}$$

$$56.5 \times 8 = 515 + x$$

$$452.0 - 515 =$$

$$\begin{array}{r}
 452 \\
 - 515 \\
 \hline
 415
 \end{array}$$

415

$$\begin{array}{r}
 452 \\
 - 415 \\
 \hline
 037
 \end{array}$$

037

Annual Day  $\rightarrow$  Dance (classical) 22  
western 22  
song

pnde  
 $\rightarrow$  pnde  
 2<sup>nd</sup> - 8M  $\rightarrow$  10M  
 10M  
 9, 8

3<sup>rd</sup> d - 8M → (9, 8)  
 remainder

Question

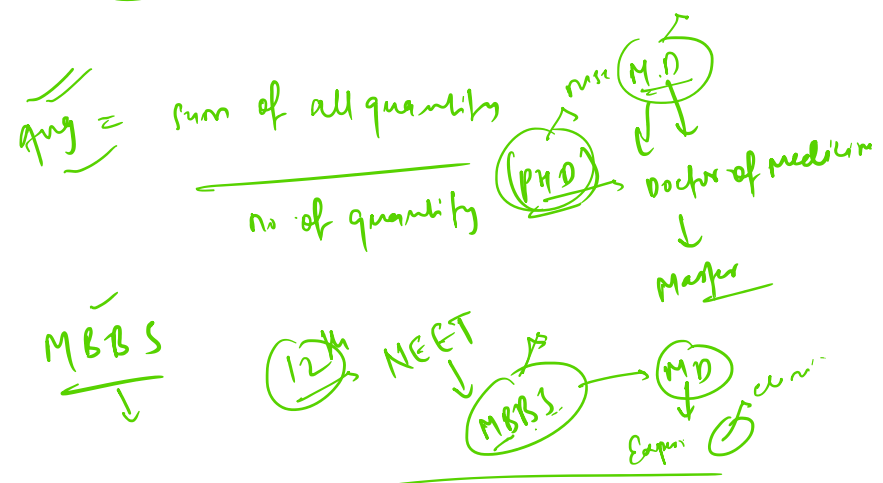
**Question 1:** If the average of 46, x, 30, 36, 59, 82, 68 and 94 is 56.5, then what is the value of x?

- a) 40
- b) 37
- c) 29
- d) 23

$$\checkmark 46 + x + 30 + 36 + 59 + 82 + 68 + 94$$

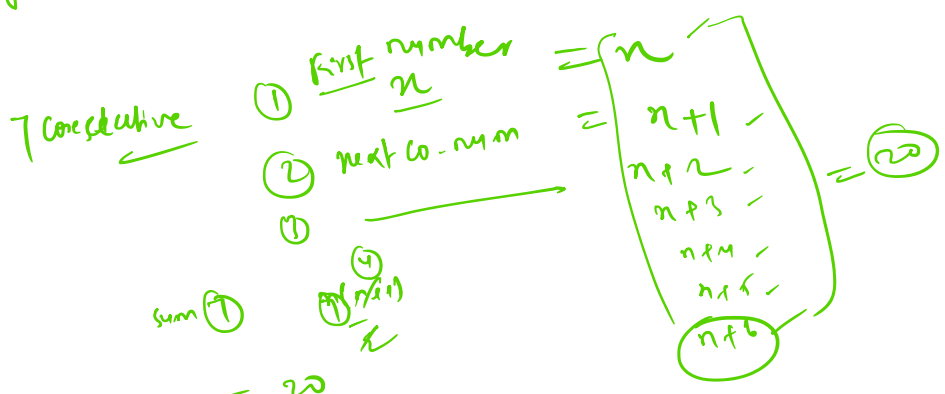
avg = 56.5

8 no



avg

**Q.4:** The average of 7 consecutive numbers is 20. What is the largest of these numbers?



$$\frac{7n + 21}{7} = 20$$

$$7n = 140 - 21$$

$$7n = 119$$

$$n = 17$$

$$n = 16$$

$$n + 6 \Rightarrow 22$$

$n = 17,$   
 $n + 6 = 23$

$$n + 6 = 23$$

Q.5: The average of 10 numbers is 23. If each number is increased by 4, what will the new average be?

$x, x+1, x+2, x+3, x+4, x+5, x+6$   
 7 numbers  
 sum  $\Rightarrow \frac{x + (x+1) + (x+2) + (x+3) + (x+4) + (x+5) + (x+6)}{7}$

$$\frac{7x + 21}{7} = 20$$

$$7x + 21 = 140$$

$$x = 17$$

$$x + 6 = 23$$

Q.5: The average of 10 numbers is 23. If each number is increased by 4, what will the new average be?

$x, x+1$   
 consecutive  
 $2, 7, 9, -9, 5, \dots$   
 $1, 2, 3, 4$

we don't know

sum of 10 num

$$23 = \frac{\quad}{10}$$

$$\text{sum of 10 num} = 230 +$$

$$\frac{2, 7, 9, -9, 5}{5} = 3$$

40

each number increased =

minimum after increasing

each number increases

40

sum of 10 num after increasing

$$\begin{array}{ccc} & +4 & \\ \textcircled{25} & \xrightarrow{\quad} & \textcircled{29} \\ & & = \frac{280+40}{10} \end{array}$$

can use avg  $\rightarrow$  4

Q1 avg of 6 consecutive odd num is 29

10  $\rightarrow$

find smallest num

$$\begin{array}{ccccccc} 3 & 5 & 7 & 9 & & & \\ \hline n & n+2 & n+4 & n+6 & n+8 & n+10 & \\ \hline \end{array}$$

$$\begin{array}{l} 6n + 30 = 29 \\ \hline n = 24 \end{array}$$

$$\frac{6n + 30}{6} = 29$$

$$\begin{array}{l} 6(n+5) = 29 \\ \hline n = 24 \end{array}$$

Sum  $29 = \frac{n + n + 2 + n + 4 + n + 6 + n + 8 + n + 10}{6}$

$$29 = \frac{6n + 30}{6}$$

$$29 = \frac{6n + 30}{6}$$

$$29 = \frac{6(n+5)}{6}$$

$$\begin{array}{l} 29 = n + 5 \\ \hline n = 29 - 5 \\ \hline 24 \end{array}$$

$$29 = \frac{x}{n} \Rightarrow x = 29n - 5$$

$$\frac{x + x = 29}{n = 29 - 5}$$

Q1 avg of 6 consecutive odd num is 29  
 find smallest num

$$\frac{6n + 15}{6} = 29$$

$$6n + 15 = 29 \times 6$$

$$6n + 15 = 174$$

$$6n = 174 - 15$$

$$6n = 159$$

$$n = \frac{159}{6}$$

$$n = 26.5$$

or

$$\frac{6n + 6 \times 5}{6} = 29$$

$$6n + 30 = 29 \times 6$$

$$6n + 30 = 174$$

$$6n = 174 - 30$$

$$6n = 144$$

$$n = \frac{144}{6}$$

$$n = 24$$

Q.8: The average age of three boys is 15 years and their ages are in proportion 3:5:7.  
 What is the age in years of the youngest boy?

isto  $\rightarrow$   $\therefore$  Ratio & proportion

Let the ages be  $3x, 5x, 7x$

$$15 = \frac{3x + 5x + 7x}{3}$$

$$15 \times 3 = 3x + 5x + 7x$$

$$45 = 15x$$

$$x = \frac{45}{15}$$

$$x = 3$$

Q.8: The average age of three boys is 15 years and their ages are in proportion 3:5:7.  
 What is the age in years of the youngest boy?

Solution: Let the age of the youngest boy be  $x$ .

As per the question;

$$\frac{(3x+5x+7x)}{3} = 15$$

$$3x+5x+7x = 45$$

$$15x = 45$$

$$x = 45/15$$

How  
 Why

$$15 = \frac{3n + 5n + 7n}{3}$$

$$15 \times 3 = 3n + 5n + 7n$$

$$45 = 15n$$

$$n = \frac{45}{15}$$

$$n = 3$$

(Note)

15x = 45

x = 45/15

x = 3

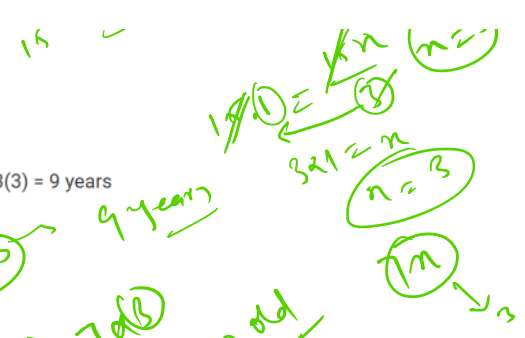
Age of the youngest boy is: 3x = 3(3) = 9 years

n = 3

3 \* n

oldest => 7 (3)

21 years old



### Types of average

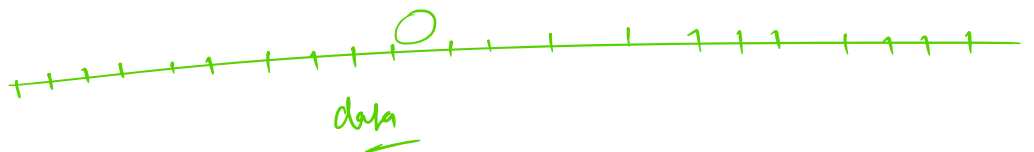
- ① mean → (avg)
- ② median
- ③ mode

1, 2, 1, 3, 5, 7, 3, 2, 1, 2, 5, 3, 2, 2

$$\frac{1 + 2 + 1 + 3 + 5 + 7 + 3 + 2 + 1 + 2 + 5 + 3 + 2 + 2}{14}$$

mean => 2.57

$$\frac{36}{14} = 2.57 \text{ (mean)}$$



median



2. The runs scored by 11 players in the cricket match are as follows:

7, 16, 121, 51, 101, 81, 1, 16, 9, 11, 16

Find the median of the data.

3. Find the median for the data 8, 5, 7, 10, 15, 21.

Handwritten notes and calculations for finding the median:

For question 2, the data is sorted: 1, 9, 11, 16, 16, 51, 81, 101, 121. The median is the 6th term, which is 51.

For question 3, the data is sorted: 5, 7, 8, 9, 10, 15, 21. The median is the 4th term, which is 9.

Handwritten calculations for question 3:

$$\frac{9+9}{2} = 9$$

Handwritten notes for question 3:

two numbers → 6, 7 → mean =  $\frac{6+7}{2} = 6.5$

median =  $\frac{6+7}{2} = 6.5$

mean & median will be same

Handwritten notes for question 2:

mode → 16

Value which occurs more no. of times

3 median = 2 mean + mode



$$3 \text{ median} = 2 \text{ mean} + \text{mode}$$

5. For a moderately skewed distribution, mean = 12 and mode = 6. Using these values, find the value of the median.

$$3 \text{ median} = 2 \text{ mean} + \text{mode}$$

$$\downarrow$$

$$24 + 6$$

$$3 \text{ median} = 30$$

$$\frac{30}{3} = 10$$

7. Find the median of the first 6 whole numbers.

Solution:

*[Handwritten notes and scribbles over the printed solution]*

8. What is the median of 4, 2, 7, 3, 10, 9, 13?

$$2 + 3 = 5$$

$$0, 1, 2, 3, 4, 5 \rightarrow \frac{6}{2} = 3$$

even

$$\frac{\left(\frac{n}{2}\right)^{\text{th}} + \left(\frac{n}{2} + 1\right)^{\text{th}}}{2}$$

even data

$$0, 1, 2, 3, 4, 5 \quad n = 6$$

$$\frac{\left(\frac{6}{2}\right)^{\text{th}} + \left(\frac{6}{2} + 1\right)^{\text{th}}}{2} = \frac{2 + 3}{2} = 2.5$$

$$\frac{n}{2}$$

Q.8: The average age of three boys is 15 years and their ages are in proportion 3:5:7. What is the age in years of the youngest boy?

Solution: Let the age of the youngest boy be x.

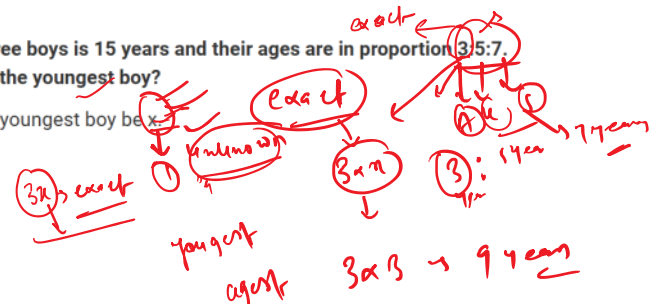
As per the question;

$$(3x + 5x + 7x) / 3 = 15$$

$$3x + 5x + 7x = 45$$

$$15x = 45$$

$$x = 45 / 15$$



Q.8: The average age of three boys is 15 years and their ages are in proportion (3:5:7).  
What is the age in years of the youngest boy?

Solution: Let the age of the youngest boy be  $x$ .

As per the question;

$$(3x+5x+7x)/3 = 15$$

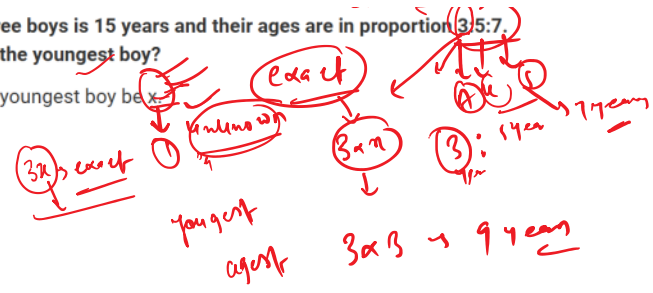
$$3x+5x+7x = 45$$

$$15x = 45$$

$$x = 45/15$$

$$x = 3$$

Age of the youngest boy is:  $3x = 3(3) = 9$  years



Step 1 assume some variable so that we can know kind exact age of their proportion

exact  $\rightarrow 3n \rightarrow$  age of youngest boy  
 $5n \rightarrow$  age of some mid boy  
 $7n \rightarrow$  age of eldest boy

A/Q  $\rightarrow$  so

avg of 3 boys = 15 years

$$\frac{3n + 5n + 7n}{3} = 15$$

$$\frac{15n}{3} = 15 \Rightarrow \frac{15n}{3} = 15 \Rightarrow n = 3$$

$$\Rightarrow 3 \times n \rightarrow 3 \times 3 = 9 \text{ years}$$

$$15n = 45$$

LHS  $\frac{15n}{3} = 15$  RHS

$$\frac{27n}{15} = \frac{243}{52} \Rightarrow n = \frac{9}{4}$$

$$\frac{n}{1} = 1 \Rightarrow n = 3$$

$$n = \frac{9}{4}$$

$$\frac{27n}{15} = \frac{243}{52} \Rightarrow n = \frac{9}{4}$$

$$n \Rightarrow \frac{27n}{13} \Rightarrow \frac{243}{52}$$

$$\textcircled{2} 27n = \frac{243 \times 13}{52} \rightarrow \frac{243 \times 13}{52}$$

$$\textcircled{3} \frac{0}{52}$$

$$\textcircled{4} n = \frac{243}{27} \textcircled{9}$$

$$\Rightarrow \textcircled{9}$$

$$27n = \frac{243 \times 13}{52 \times 4}$$

$$n = \frac{243 \times 9}{4 \times 27}$$

steps (rule/eqs)  
 $\rightarrow$   
10 mins

$$n = \frac{9}{4}$$

$$\frac{33y}{2} = \frac{3}{8}$$

$$y = \frac{2 \times 3}{33 \times 8}$$

$$33y = \frac{3 \times 2}{8 \times 4}$$

$$y = \frac{8}{4 \times 3 \times 11}$$

begin

$$\frac{33y}{8 \times 4} \times \frac{8}{8} = \frac{3}{11}$$

$$y = \frac{4}{11}$$

$$\frac{9n}{4} = \frac{9 \times 11}{11}$$

$$n = 44$$

$$\frac{7^4}{4^4} = \frac{7^4}{4^4} \quad n = 4$$

Rule of mul  $9^4 = \frac{9^4 \times 9^9}{11^9}$

$$9 \times 10^4 n = 10^6$$

$$\frac{3 \times 33^4}{2^4} = \frac{3^4}{8^4}$$

$$\frac{3 \times 33}{2} = \frac{3^4}{8^4}$$

$$y = \frac{1}{4}$$

$$y = \frac{3}{4}$$

10000

1000000

$$9 \times 10^4 n = 90 \times 10^6$$

$$n = 10^3$$

$$n = 90 \times 10^6$$

$$10^3$$

$$1000$$

power / Exponent of 10000

$$10^3 = 1000$$

base

$10 \times 10 \times 10$

$$10^n = n = 6$$

$10 \times 10 \times 10 \dots \times 10$

$10 \times 10 \times 10$

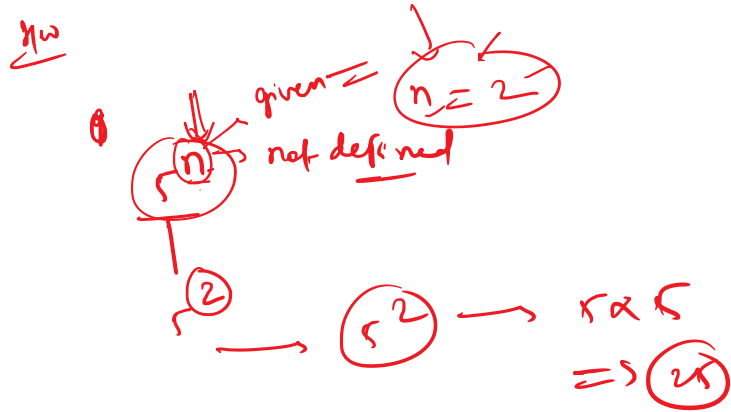
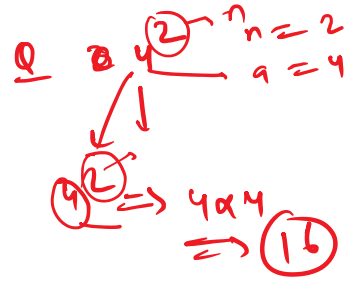
$$10^n \rightarrow n = 10$$

$$10 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10$$

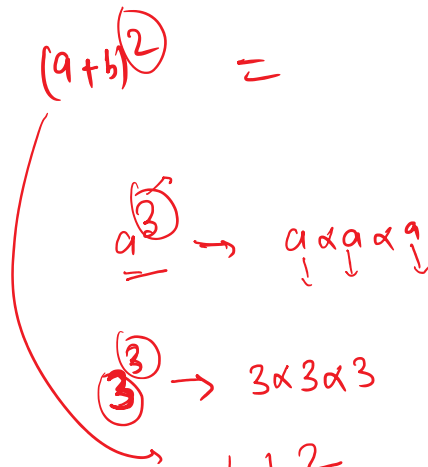
base

$$2^3 = 2 \times 2 \times 2 = 8$$

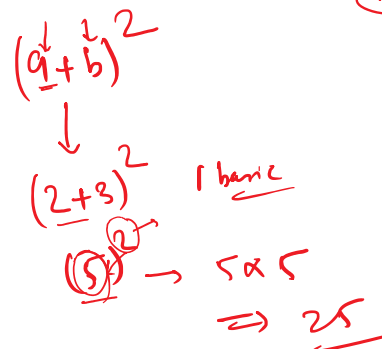
$a^n \rightarrow$  Exponent  
 $\downarrow$   
 base



Q 10  $a=2, b=3$   
 $\alpha$



many ways



11 way  
 $(a+b)^2 = (a+b)(a+b) \rightarrow$  Algebra

$a(a+b) + b(a+b)$   
 $\downarrow$   
 $a^2 + ab + ab + b^2$

$$a^2 + ab + ab + b^2$$

$$\boxed{a^2 + b^2 + 2ab}$$

$$(2)^2 + (3)^2 + 2 \times 3 \times 2$$

$$4 + 9 + 2 \times 6$$

$$4 + 9 + 12$$

$$\Rightarrow 25 \checkmark$$

$$(9-4)^2 = (9-4) \rightarrow (5)^2 \rightarrow 25$$

$$\text{alt. way} \rightarrow a^2 + b^2 - 2 \times a \times b$$

$$81 + 16 - 72$$

$$\Rightarrow 25$$

Q. All the Aug, Data h.

use Series

Set  $\rightarrow$  Take Test  $\rightarrow$  Some + Outside whole

$$3:5:7$$

e 3. Find the missing number i

proportion:

$$\square : 8 :: 12 : 32$$

Return

Fraction Comparison

$$1:3$$

$$1:3$$

Kamla  $\rightarrow$  9 years  
Anita  $\rightarrow$  27 years

$$3n + 7m = 15$$

$$\underline{\quad 3}$$

The ratio of Anita's age and Kamla's age is

The ratio of Amit's age and ~~ratio~~ <sup>ratio</sup> Kirti's age is  $1:3$  and ~~sum of~~ sum of age is 36 years

