

# Ratio

## Practice Problems:

Date: \_\_\_\_\_

Question No: 1

In a class, the number of boys is more than the numbers of girls by 12% of total strength of the class. Find the ratio of boys to girls?

Solution:

Let the number of girls =  $x$

Let the number of boys =  $x + 12\%$

Let the total strength be = 100%

Number of girls :

$$x + x + 12\% = 100$$

$$2x + 12\% = 100$$

$$2x = 100 - 12\%$$

$$2x = 88\%$$

$$x = \frac{88\%}{2}$$

$$x = 44\%$$

The number of girls is 44%.

Now;

Putting the value of  $x$  to find the number of boys

$$x + 12\%$$

$$44\% + 12\%$$

$$56\%$$

The number of boys in class is 56%

Ratio of Boys to Girls = 56 : 44

Ratio = 14 : 11

The ratio of boys to girls is 14:11

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Question No: 2

Find the ratio of 3.5 kg to 280 grams.

Solution:

Converting kg to grams

$$1 \text{ kg} = 1000 \text{ g}$$

So,

$$3.5 \text{ kg} = 3.5 \times 1000 = 3500 \text{ g}$$

Ratio =

$$3500 : 280$$

$$75 : 14$$

$$25 : 2$$

The ratio of 3.5 kg to 280 g is 25 : 2.

Question No: 3

The price of 80 shirts is Rs. 22000. What will be price of 30 shirts?

Solution:

$$80 : 30 = 22000 : x$$

Product of Extremes = Product of Means.

$$80 \times x = 30 \times 22000$$

$$x = \frac{30 \times 22000}{80}$$

$$x = 3 \times 8250$$

$$x = 24750$$

The cost of 30 shirts would be Rs. 8100.

Question No: 4

(a) Ramza spends 20% of his total income on house rent, 70% on domestic expenditure. If his savings is Rs. 1800. What will be his total income?

Solution:

Let his income be = 100x

House rent expenses = 20% x

Domestic expenditure = 70% x

Savings = Rs. 1800

$$\text{Total expenses} = 20\% + 70\% \cdot x = 90\% \cdot x$$

$$\therefore \text{Saving} = \text{Income} - \text{Expenditure}$$

$$\text{Income} = \text{Saving} + \text{Expenditure}$$

$$100\% \cdot x = 1800 + 90\% \cdot x$$

$$100x - 90x = 1800$$

$$10x = 1800$$

$$x = \frac{1800}{10}$$

$$x = 180$$

So,

$$\text{Income} = 100 \times 180$$

$$\text{Income} = 18000$$

The total income of Hamza is 18000.

b) Change into fractions 70%

$$\text{Fractions} = \frac{70}{100}$$

$$\text{Fractions} = \frac{7}{10}$$

c) Find 15% of 600.

$$15\% \times 600$$

$$\frac{15}{100} \times 600$$

$$90$$

15% of 600 is 90.

Question No: 4

a) Which fraction is larger in the following?

$$\frac{7 \times 4}{9 \times 4}, \frac{1 \times 9}{4 \times 9}, \frac{13 \times 1}{36 \times 1}$$

$$\frac{28}{36}, \frac{9}{36}, \frac{13}{36}$$

$$\frac{28}{36}, \frac{9}{36}, \frac{13}{36}$$

Solve

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(a)  $(7)^2 + x - (2 \times 4) \div 2$

$$49 + x - 8 \div 2$$

$$49 + x - 4$$

$$49 - 4 + x$$
$$45 + x$$

(b)  $9 + 3 + 3 \times 2$

$$9 + 3 + 6$$

$$18$$

(c)  $(x^2)^3 = ?$

$$x^6$$

(d)  $x^a \cdot x^b$

$$x^{a+b}$$

$$x^{a+b}$$

$$\frac{x^a \cdot x^b}{x^c \cdot x^d}$$

$$\frac{x^a \cdot x^b}{x^c \cdot x^d}$$

(e) Convert into meter : 10cm

$$1\text{cm} = \frac{1}{100} \text{m}$$

$$10\text{cm} = \frac{10}{100} \text{m}$$

$$10\text{cm} = 0.10\text{m}$$

Average:

The average monthly income of P and Q is Rs. 5050.  
The average monthly income of Q and R is Rs. 6250.  
and average monthly income of P and R is Rs. 5100.  
Find the average monthly income of P.

Solution:

The average monthly income of P and Q = Rs. 5050

$$\text{Average} = \frac{\text{Sum}}{\text{Total no of Observations}}$$

$$5050 = \frac{P+Q}{2}$$

$$5050 \times 2 = P+Q$$

$$10,100 = P+Q \quad \text{--- eq (i)}$$

The average monthly income of Q and R = Rs. 6250

$$\text{Average} = \frac{\text{Sum}}{\text{Total no of Observations}}$$

$$6250 = \frac{Q+R}{2}$$

$$6250 \times 2 = Q+R$$

$$12,500 = Q+R \quad \text{--- eq (ii)}$$

Date:

The average monthly income of P and R is 5200

$$\text{Average} = \frac{\text{Sum}}{\text{Total no of observation}}$$

$$5200 = \frac{P+R}{2}$$

$$5200 \times 2 = P+R$$

$$10400 = P+R \quad \text{--- eq (iii)}$$

Adding eq (i), (ii) and (iii)

$$P+Q + Q+R + P+R = 10,100 + 12,500 + 10,400$$

$$2(P+Q+R) = 33,000$$

$$P+Q+R = \frac{33,000}{2}$$

$$P+Q+R = 16500 \quad \text{--- eq (iv)}$$

Putting eq (iii) in (iv)

$$P+Q+R = 16500$$

$$P+(12,500) = 16,500$$

$$P = 16,500 - 12,500$$

$$P = 4000$$

The average monthly income of P = 4000.

# Mean, Median, Mode, Range

## Practice Problems

Q1: There are 9 students in a group having ages 15, 15, 16, 16, 16, 17, 17, 18, 19. Calculate mean, median, mode & range.

Solution:

$$\rightarrow \text{Mean} = \frac{\text{No of observations}}{\text{Total}}$$

$$\text{Mean} = \frac{15+15+16+16+16+17+17+18+19}{9}$$

$$\text{Mean} = \frac{149}{9} = 16.55$$

$$\rightarrow \text{Median} = 15, 15, 16, 16, 16, 17, 18, 19$$

$$\text{Median} = 16$$

$$\rightarrow \text{Mode} = 15, 15, 16, 16, 16, 17, 17, 18, 19$$

$$\text{Mode} = 16$$

$$\rightarrow \text{Range} = \text{Highest} - \text{Lowest}$$

$$\text{Range} = 19 - 15$$

$$\text{Range} = 4$$



Date: \_\_\_\_\_

Question: 2 The front row of the movie theatre has 23 seats. If you were asked to sit in the seat that occupied the median position, on which seat you have to sit?

Solution:

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17,

18, 19, 20, 21, 22, 23

Median = 12

I will occupy the 12<sup>th</sup> seat.

Question: 3 A student recorded her scores on weekly math quizzes that were marked out of a possible 10 points. Her score were as follows:

8, 5, 8, 5, 7, 6, 7, 7, 5, 7, 5, 5, 6, 6, 9, 8, 9, 7, 9, 9, 6, 8, 6, 6, 7 what is the mode for her score on the weekly math quizzes?

Solution:

Arranging in ascending order:

5, 5, 5, 5, 5, 6, 6, 6, 6, 6, 6, 7, 7, 7, 7, 7, 8, 8, 8, 8, 9, 9, 9, 9.

Mode

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Question: 4 Rashid buys three books for Rs. 16 each and four books for Rs. 23 each. What will be the average price of books?

Solution:

$$\text{Average} = \frac{\text{Sum of observations}}{\text{Total observations}}$$

$$\text{Average} = \frac{16+16+16+23+23+23+23}{7}$$

$$\text{Average} = \frac{140}{7}$$

$$\text{Average} = 7$$

Therefore, the average price of book is Rs. 7.00.

Question: 5 A student gets 75, 82, 86 marks on three tests. What must be his marks on the next test, so that his average for the four tests will be 85?

Solution:

$$\text{Average} = \frac{\text{Sum of observations}}{\text{Total}}$$

$$85 = \frac{75 + 82 + 86 + x}{4}$$

$$85 \times 4 = 243 + x$$

$$340 = 243 + x$$

$$340 - 243 = x$$

$$97 = x$$

The marks of 4th test must be 97.

Date:

Question 6: A car travelled 100 km with half a distance at 40 km/h and the other half at 80 km/h. Find the average speed of the car for the whole journey?

Solution:

Total distance travelled =  $d = 100$  km

Speed for 50 km =  $s_1 = 40$  km/h

Speed for other 50 km =  $s_2 = 80$  km/h

Average Speed = ?

From formula we know:

$$\text{Speed} = \frac{\text{distance}}{\text{time}}$$

$$\text{time} = \frac{\text{distance}}{\text{speed}}$$

$$t_1 = \frac{50}{40} = 1.25 \text{ s}$$

$$t_2 = \frac{50}{80} = 0.625 \text{ s}$$

$$T = t_1 + t_2$$

$$T = 1.25 + 0.625$$

$$T = 1.875$$

$$S = \frac{d}{T}$$

$$S = \frac{100}{1.875}$$

$$S = 53.33$$

The average speed of the car for entire journey is 53.33 km/h

# Geometry

## Practice Problems

Date: \_\_\_\_\_

Question 1:

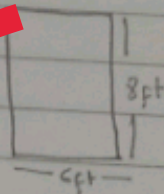
A window has a length of 8 feet and width of 6 feet. What is area?

Solution =

Area of Rectangle = length  $\times$  width

$$\text{Area} = 8 \times 6$$

$$\text{Area} = 48 \text{ feet.}$$



Therefore, the area covered by window is 48 feet.

Question No 2:

A triangular-shaped yard has a base 25 meters and a height 12 meters. What is its area?

Solution =

Area of triangle =  $\frac{1}{2} \times \text{base} \times \text{height}$

$$\text{Area of triangle} = \frac{1}{2} \times 25 \times 12$$

Area of triangular yard = 150 meters.

Question No: 3

The perimeter of a square is 188 cm. What is the length of each side?

Solution:

$$\text{Perimeter} = 4(\text{sides})$$

$$188 = 4(\text{sides})$$

$$\frac{188}{4} = \text{sides}$$

$$47 \text{ cm} = \text{sides}$$

So, the length of each side is 47 cm.

Date:

Question No: 4 A triangular shaped rug has a base of 7 meter and a height of 6 meter. What is its area?

Solution:

$$\text{Area of triangle} = \frac{1}{2} \times \text{base} \times \text{height}$$

$$\text{Area of triangle} = \frac{1}{2} \times 7 \times 6$$

$$\text{Area of triangle} = \frac{1}{2} \times 42$$

$$\text{Area of triangle} = 21 \text{ m}$$

Therefore, the area occupied by triangular rug is 21 meters.

Question No: 5 Find the volume of the brick with length of 24 cm, width 12 cm & height 6 cm respectively.

Solution:

$$\text{Volume of brick} = \text{length} \times \text{width} \times \text{height}$$

$$\text{Volume} = 24 \text{ cm} \times 12 \text{ cm} \times 6 \text{ cm}$$

$$\text{Volume} = 1728 \text{ cm}$$

So, the volume of brick is 1728 cm.

Question 6: Find the perimeter of hexagon with a side length of 10 meter.

Solution:

$$\text{Perimeter} = 10 + 10 + 10 + 10 + 10 + 10$$

$$\text{Perimeter} = 60 \text{ m}$$

The perimeter of hexagon is 60m.

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Question 7: A square has an area of  $225\text{cm}^2$ .  
What is its perimeter?

Solution:

$$\text{Area of square} = (L)^2$$

$$225\text{cm}^2 = (L)^2$$

$\sqrt{\text{ } \frac{1}{2}}$

$$\sqrt{225} = \sqrt{(L)^2}$$

$$15\text{cm} = L$$

So, the length of each side is  $15\text{cm}$ .

Now, we will find the perimeter

$$P = 4(L)$$

$$P = 4(15)$$

$$P = 60\text{cm}$$

The perimeter of square with area  $225\text{cm}^2$   
is  $60\text{cm}$ .

Question 8: Find the area of circle which has  
diameter of  $8\text{cm}$ .

Solution:

$$\text{Area of circle} = \pi r^2 = \pi \frac{d^2}{4}$$

$$\text{Area of circle} = \frac{22 \times (8)^2}{7 \times 4}$$

$$\text{Area} = \frac{22 \times 64}{7 \times 4}$$

$$\text{Area} = \frac{11 \times 64}{7 \times 2}$$

$$\text{Area} = \frac{11 \times 32}{7}$$

$$\text{Area} = \frac{352}{7} = 50.2\text{ cm}^2$$

Question No: 9 Find the volume of a football with radius of 10cm.

Solution:

$$\text{Volume of sphere} = \frac{4}{3} \pi r^3$$

$$\text{Volume} = \frac{4}{3} \times 22 \times (10)^3$$

$$\text{Volume} = \frac{4 \times 22 \times 1000}{3}$$

$$\text{Volume} = \frac{88000}{3}$$

$$\text{Volume} = 4190.47 \text{ cm}^3$$

The volume of football is  $4190.47 \text{ cm}^3$ .

Question No: 10. A triangle contains three angles if two angles are 45 degree and 90 degree respectively, Find the 3<sup>rd</sup> angle of triangle?

$$\text{Sum of three angles of triangle} = 180^\circ$$

$$a + b + c = 180^\circ$$

$$45^\circ + 90^\circ + c = 180^\circ$$

$$135^\circ + c = 180^\circ$$

$$c = 180^\circ - 135^\circ$$

$$c = 45^\circ$$

The third angle of triangle is  $45^\circ$

Overall good answer structures