

1. Express the following ratios in simplest form:

(i) $(1/6) : (1/9)$

(ii) $4\frac{1}{2} : 1\frac{1}{8}$

(iii) $(1/5) : (1/10) : (1/15)$

Solution:

(i) $(1/6) : (1/9)$

Given

$$\text{Ratio} = (1/6) : (1/9)$$

$$= (1/6) \div (1/9)$$

$$= (1/6) \times (9/1)$$

We get,

$$= 3/2$$

$$= 3 : 2$$

(ii) $4\frac{1}{2} : 1\frac{1}{8}$

This can be written as,

$$(9/2) : (9/8)$$

Given ratio = $(9/2) : (9/8)$

$$(9/2) \div (9/8)$$

$$= (9/2) \times (8/9)$$

We get,

$$= 4/1$$

$$= 4 : 1$$

(iii) $(1/5) : (1/10) : (1/15)$

L.C.M. of 5, 10, 15 is 30

5	5	10	15
	1	2	3

$$\text{L.C.M.} = 5 \times 2 \times 3$$

$$= 30$$

$$= (1/5) \times 30 : (1/10) \times 30 : (1/15) \times 30$$

We get,

$$= 6 : 3 : 2$$

2. Find the ratio of each of the following in simplest form:

(i) Rs 5 to 50 paise

(ii) 3 km to 300 m

(iii) 9 m to 27 cm

(iv) 15 kg to 210 g

(v) 25 minutes to 1.5 hours

(vi) 30 days to 36 hours

Solution:

(i) Rs 5 to 50 paise

$$= 500 \text{ paise} : 50 \text{ paise}$$

$$= 500 / 50$$

$$= 50 / 5$$

Dividing by 5, we get,

$$= 10 / 1$$

$$= 10 : 1$$

(ii) 3 km to 300 m

WKT

$$1 \text{ km} = 1000 \text{ m}$$

Hence,

$$3000 \text{ m} : 300 \text{ m}$$

$$= 3000 / 300$$

$$= 30 / 3$$

Dividing by 3, we get,

$$= 10 / 1$$

$$= 10 : 1$$

(iii) 9 m to 27 cm

WKT

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

Hence,

$$= 9 \times 100 \text{ cm} : 27 \text{ cm}$$

$$= (900 / 27) \text{ cm}$$

Dividing by 9, we get,

$$= 100 / 3$$

$$= 100 : 3$$

(iv) 15 kg to 210 g

WKT

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

$$= 15 \times 1000 \text{ g} : 210 \text{ g}$$

$$= 15000 : 210$$

$$= (1500 / 21) \text{ g}$$

Dividing by 30, we get,

$$= 500 / 7$$
$$= 500: 7$$

(v) 25 minutes to 1.5 hours

$$= 25 \text{ minutes}: (3 / 2) \times 60$$
$$= 25 / 90$$

Dividing by 5, we get,

$$= 5 / 18$$
$$= 5: 18$$

(vi) 30 days to 36 hours

$$= 30 \times 24 \text{ hours to } 36 \text{ hours}$$
$$= 720: 36$$
$$= 720 / 36$$

Dividing by 36, we get,

$$= 20 / 1$$
$$= 20: 1$$

3. Which of the following statements are true?

(i) **2.5: 1.5:: 7.0: 4.2**

(ii) **$(1 / 2): (1 / 3) = (1 / 3): (1 / 4)$**

(iii) **24 men: 16 men = 33 horses: 22 horses.**

Solution:

(i) **2.5: 1.5:: 7.0: 4.2**

Here,

$$\text{Product of extremes} = 2.5 \times 4.2$$

We get,

$$= 10.50$$

$$\text{Product of means} = 1.5 \times 7.0$$

We get,

$$= 10.50$$

By cross product rule

$$\text{Product of extremes} = \text{Product of means}$$

Therefore,

$$2.5: 1.5:: 7.0: 4.2 \text{ is a true statement}$$

(ii) **$(1 / 2): (1 / 3) = (1 / 3): (1 / 4)$**

Here,

$$\text{Product of extremes} = (1 / 2) \times (1 / 4)$$

We get,

$$= (1 / 8)$$

$$\text{Product of means} = (1 / 3) \times (1 / 3)$$

We get,

$$= (1 / 9)$$

By cross product rule

$$\text{Product of extremes} \neq \text{Product of means}$$

Therefore,

$$(1 / 2) : (1 / 3) = (1 / 3) : (1 / 4) \text{ is not a true statement}$$

(iii) 24 men: 16 men = 33 horses: 22 horses

$$\text{Product of extremes} = 24 \times 22$$

We get,

$$= 528$$

$$\text{Product of means} = 16 \times 33$$

We get,

$$= 528$$

By cross product rule

$$\text{Product of extremes} = \text{Product of means}$$

Therefore,

$$24 \text{ men} : 16 \text{ men} = 33 \text{ horses} : 22 \text{ horses} \text{ is a true statement}$$

4. Check whether the following numbers are in proportion or not:

(i) 18, 10, 9, 5

(ii) $3, 3\frac{1}{2}, 4, 4\frac{1}{2}$

(iii) 0.1, 0.2, 0.3, 0.6

Solution:

(i) 18, 10, 9, 5

Here,

$$\text{Product of extremes} = 18 \times 5$$

We get,

$$= 90$$

$$\text{Product of means} = 10 \times 9$$

We get,

$$= 90$$

By cross product rule

$$\text{Product of extremes} = \text{Product of means}$$

Therefore,

The given numbers, 18, 10, 9, 5 are in proportion

(ii) $3, 3\frac{1}{2}, 4, 4\frac{1}{2}$

Here,

$$\begin{aligned}\text{Product of extremes} &= 3 \times 4\frac{1}{2} \\ &= 3 \times (9/2)\end{aligned}$$

$$\begin{aligned}\text{We get,} \\ &= (27/2)\end{aligned}$$

$$\begin{aligned}\text{Product of means} &= 3\frac{1}{2} \times 4 \\ &= (7/2) \times 4\end{aligned}$$

$$\begin{aligned}\text{We get,} \\ &= 14\end{aligned}$$

By cross product rule

Product of extremes \neq Product of means

Therefore,

The given numbers, $3, 3\frac{1}{2}, 4, 4\frac{1}{2}$ are in proportion

(iii) 0.1, 0.2, 0.3, 0.6

Here,

$$\text{Product of extremes} = 0.1 \times 0.6$$

$$\begin{aligned}\text{We get,} \\ &= 0.06\end{aligned}$$

$$\text{Product of means} = 0.2 \times 0.3$$

$$\begin{aligned}\text{We get,} \\ &= 0.06\end{aligned}$$

By cross product rule

Product of extremes = Product of means

Therefore,

The given numbers, 0.1, 0.2, 0.3, 0.6 are in proportion

5. 6 bowls cost Rs 90. What would be the cost of 10 such bowls?

Solution:

Cost of 6 bowls = Rs 90

Let the cost of 10 bowls be Rs x

$$6: 10 = 90: x$$

$$6 \times x = 10 \times 90 \quad (\text{ad} = \text{bc})$$

$$6x = 900$$

$$x = 900 / 6$$

We get,

$$x = \text{Rs } 150$$

Therefore,

Cost of 10 bowls = Rs 150

6. Ten pencils cost Rs 15. How many pencils can be bought with Rs 72?

Solution:

Cost of 10 pencils = Rs 15

Let us assume that the number of pencils bought with Rs 72 = x

$$10: x = 15: 72$$

$$x \times 15 = 10 \times 72 \quad (\text{bc} = \text{ad})$$

We get,

$$15x = 720$$

$$x = 720 / 15$$

$$x = 48$$

Therefore,

Number of pencils = 48

7. Convert the following speeds into m/sec:

(i) 72 km/h

(ii) 9 km/h

(iii) 1.2 km/minutes

(iv) 600 m/hour

Solution:

(i) 72 km/h

WKT

$$1 \text{ km} = 1000 \text{ m and}$$

$$1 \text{ hour} = 3600 \text{ sec}$$

Hence,

$$1 \text{ km} / \text{h} = (1000) / (3600)$$

$$= (5 / 18) \text{ m/s}$$

Therefore,

$$72 \text{ km/h} = (5 / 18) \times 72 \text{ m/sec}$$

We get,

$$= 20 \text{ m/ sec}$$

(ii) 9 km/h

$$1 \text{ hour} = 3600 \text{ sec}$$

$$1 \text{ km} = 1000 \text{ m}$$

$$1 \text{ km} / \text{m} = (1000) / (3600)$$

We get,

$$= (5 / 18) \text{ m/s}$$

Therefore,

$$9 \text{ km/h} = (5 / 18) \times 9 \text{ m/sec}$$

We get,

$$= (5 / 2)$$

$$= 2.5 \text{ m/ sec}$$

(iii) 1.2 km/minutes

$$1 \text{ hour} = 60 \text{ minutes}$$

$$1.2 \text{ km/min} = 1.2 \times 60 \text{ km/h}$$

Now,

$$1 \text{ km/ h} = (5 / 18) \text{ m/s}$$

$$1.2 \times 60 \text{ km/ h} = 1.2 \times 60 \times (5 / 18) \text{ m/sec}$$

$$= 72 \times (5 / 18) \text{ m/sec}$$

We get,

$$= 20 \text{ m/sec}$$

(iv) 600 m/ hour

$$= (600) / (1000) \text{ km/h}$$

$$= \{(600 \times 5) / (1000 \times 18)\} \text{ m/sec}$$

We get,

$$= (1 / 6) \text{ m/sec}$$

