

Question 1.

Check whether the given two ratios form a proportion or not:

(i) 4 : 6 and 12 : 18

(ii) 15:45 and 40 :120

(iii) 14 : 4 and 18 : 6

(iv) 12 : 18 and 28 : 12

Solution:

4 : 6 and 12 : 18

$$\frac{4}{6} \text{ and } \frac{12}{18} = \frac{2}{3} \text{ and } \frac{2}{3} \\ = 2 : 3 \text{ and } 2 : 3 \text{ Yes.}$$

(ii) 15 : 45 and 40 : 120

$$\frac{15}{45} \text{ and } \frac{40}{120} \\ = \frac{1}{3} \text{ and } \frac{1}{3} \text{ Yes.}$$

(iii) 14 : 4 and 18 : 6

$$\frac{14}{4} \text{ and } \frac{18}{6} = \frac{7}{2} \text{ and } \frac{3}{1} \\ = 7 : 2 \text{ and } 3 : 1 \text{ No.}$$

(iv) 12 : 18 and 28 : 12

$$\frac{12}{18} \text{ and } \frac{28}{12} \\ = \frac{2}{3} \text{ and } \frac{7}{3} \text{ No.}$$

Question 2.

Write true (T) or false (F) against each of the following statements:

(i) $16 : 24 = 20 : 30$

(ii) $16 : 24 = 30 : 20$

(iii) $21 : 6 :: 35 : 10$

(iv) $5.2 : 3.9 :: 3 : 4$

Solution:

(i) $16 : 24 = 20 : 30$

$2 : 3 = 2 : 3$ True

(ii) $16 : 24 = 30 : 20$

$2 : 3 = 3 : 2$ False

(iii) $21 : 6 :: 35 : 10$

$21 : 6 = 35 : 10$

$7 : 2 = 7 : 2$ True

(iv) $5.2 : 3.9 :: 3 : 4$

$$\frac{5.2}{3.9} = \frac{5.2 \times 10}{3.9 \times 10} = \frac{52}{39}$$

$$= \frac{52 \div 13}{39 \div 13} = \frac{4}{3}$$

$$= 4 : 3$$

$$\therefore 4 : 3 \neq 3 : 4$$

$$5.2 : 3.9 :: 3 : 4 \text{ False}$$

Question 3.

Find which of the following are in proportion:

(i) 12, 16, 6, 8

(ii) 2, 3, 4, 5

(iii) 18, 10, 9, 5

(iv) 18, 9, 10, 5

Solution:

(i) 12, 16, 6, 8

$$12 : 16 :: 6 : 8$$

$$\Rightarrow \frac{12}{16} = \frac{6}{8}$$

$$12 \times 8 = 16 \times 6 \Rightarrow 96 = 96$$

$\therefore 12 : 16 :: 6 : 8$ are in proportion

(ii) 2, 3, 4, 5

$$2 : 3 :: 4 : 5$$

$$\Rightarrow \frac{2}{3} = \frac{4}{5}$$

$$2 \times 5 = 3 \times 4 \Rightarrow 10 = 12 \text{ not in proportion}$$

(iii) 18, 10, 9, 5

$$18 : 10 :: 9 : 5$$

$$\Rightarrow \frac{18}{10} = \frac{9}{5}$$

$$\therefore 18 \times 5 = 10 \times 9 \Rightarrow 90 = 90$$

$\therefore 18 : 10 :: 9 : 5$ are in proportion

(iv) 18, 9, 10, 5

$$18 : 9 :: 10 : 5$$

$$\Rightarrow \frac{18}{9} = \frac{10}{5}$$

$$18 \times 5 = 9 \times 10$$

$$\Rightarrow 90 = 90$$

$\therefore 18 : 9 :: 10 : 5$ are in proportion

Question 4.

Are the following statements true?

(i) 39 kg : 36 kg = 26 men : 24 men

(ii) 45 km : 60 km = 12 hours : 15 hours

(iii) 40 people : 200 people = ₹1000 : ₹5000

(iv) 7.5 litres : 15 litres = 15 children : 30 children

Solution:

(i) 39 kg : 36 kg = 26 men : 24 men

$$\text{We have, } 39 : 36 = \frac{39}{36} = \frac{13}{12}$$

$$\text{And, } 26 : 24 = \frac{26}{24} = \frac{13}{12}$$

$$\therefore 39 : 36 = 26 : 24$$

So, the given statement is true.

(ii) 45 km : 60 km = 12 hours : 15 hours

$$\text{We have, } 45 : 60 = \frac{45}{60} = \frac{3}{4}$$

$$\text{And, } 12 : 15 = \frac{12}{15} = \frac{4}{5}$$

$$\therefore 45 : 60 \neq 12 : 15$$

So, the given statement is false.

(iii) 40 people : 200 people = ₹ 1000 : ₹5000

$$\text{We have, } 40 : 200 = \frac{40}{200} = \frac{20}{100} = \frac{1}{5}$$

$$\text{And, } 1000 : 5000 = \frac{1000}{5000} = \frac{1}{5}$$

$$\therefore 40 : 200 = 1000 : 5000$$

So, the given statement is true.

(iv) 7.5 litres : 15 litres = 15 children : 30 children

$$\text{We have, } 7.5 : 15 = \frac{7.5}{15} = \frac{2.5}{5}$$

$$= \frac{2.5}{5 \times 10} = \frac{25}{50} = \frac{1}{2}$$

$$\text{And, } 15 : 30 = \frac{15}{30} = \frac{1}{2}$$

$$\therefore 7.5 : 15 = 15 : 30$$

So, the given statement is true.

Question 5.

Determine if the following ratios form a proportion.

Also, write the middle terms and extreme terms when the ratios form a proportion. .

(i) 25 cm : 1 m and ₹40 : ₹ 160

(ii) 39 litres : 65 litres and 6 bottles : 10 bottles

(iii) 2 kg : 80 kg and 30 sec : 5 minutes

(iv) 200 g : 2.5 kg and ₹4 : ₹50

Solution:

(i) $\because 1 \text{ m} = 100 \text{ cm}$

$$\therefore 25 \text{ cm} : 1 \text{ m} = 25 \text{ cm} : 100 \text{ cm}$$

$$= \frac{25}{100} = \frac{25 \div 25}{100 \div 25}$$

[H.C.F. of 25, 100 = 25]

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

$$\text{₹}40 : \text{₹}160 = \frac{40}{160} = \frac{40 \div 40}{160 \div 40}$$

[H.C.F. of 40, 160 = 40]

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

Since, the two ratio are equal, therefore, the given ratios form a proportion. Middle terms are 1 m and ₹40. Extreme terms are 25 cm and ₹160.

$$(ii) \text{ 39 litre : 65 litre} = \frac{39}{65} = \frac{39 \div 13}{65 \div 13}$$

$$[\text{H.C.F. of 39, 65} = 13]$$

$$= \frac{3}{5} = 3 : 5$$

$$\text{6 bottle : 10 bottle} = \frac{6}{10} = \frac{6 \div 2}{10 \div 2}$$

$$[\text{H.C.F. of 6, 10} = 2]$$

$$= \frac{3}{5} = 3 : 5$$

Since the two ratios are equal, therefore, the given ratios form a proportion. Middle terms are 65 litres and 6 bottle. Extreme terms are 39 litres and 10 bottle.

$$(iii) \text{ 2 kg : 80 kg} = \frac{2}{80} = \frac{2 \div 2}{80 \div 2}$$

$$[\text{H.C.F. of 2, 80} = 2]$$

$$= \frac{1}{40} = 1 : 40$$

$$\text{30 sec : 5 min.} = \text{30 sec : } 5 \times 60 \text{ sec.}$$

$$= \frac{30}{300} = \frac{30 \div 30}{300 \div 30}$$

$$[\text{H.C.F. of 30, 300} = 30]$$

$$= \frac{1}{10} = 1 : 10$$

Since the two ratios are not equal, therefore, the given ratios do not form a proportion.

$$(iv) 2.5 \text{ kg} = 2.5 \times 1000 \text{ g} = 2500 \text{ g}$$

$$\therefore 200 \text{ g} : 2.5 \text{ kg} = 200 \text{ g} : 2500 \text{ g}$$

$$= \frac{200}{2500} = \frac{200 \div 100}{2500 \div 100}$$

$$[\text{H.C.F. of } 200, 2500 = 100]$$

$$= \frac{2}{25} = 2 : 25$$

$$\text{₹}4 : \text{₹}50 = \frac{4}{50} = \frac{4 \div 2}{50 \div 2}$$

$$[\text{H.C.F. of } 4, 50 = 2]$$

$$= \frac{2}{25} = 2 : 25$$

Since, the two ratios are equal, therefore, the given ratios form a proportion. Middle term are 2.5 kg and ₹4. Extreme terms are 200 g and ₹50.