Board –CBSE	Class – 6th	Topic – Ratios and Proportions Ex:12.2

Exercise 12.2

1. Determine if the following are in proportion,

(a) 15, 45, 40, 120

(b) 33, 121, 9, 96

(c) 24, 28, 36, 48

(d) 32, 48, 70, 210

(e) 4, 6, 8, 12

(f) 33, 44, 75, 100

Ans.

$(a)\ 15 \text{ and } 45 = \frac{15}{45} = \frac{15 \div 15}{45 \div 45} = \frac{1}{3}$

$40 \text{ and } 120 = \frac{40}{120} = \frac{40 \div 40}{120 \div 40} = \frac{1}{3}$

∴ 15 : 45 :: 40 : 120

∴ 15, 45, 40, and 120 are in proportion.

$(b)\ 33 \text{ and } 121 = \frac{33}{121} = \frac{33 \div 11}{121 \div 11} = \frac{3}{11}$

$9 \text{ and } 96 = \frac{9}{96} = \frac{9 \div 3}{96 \div 3} = \frac{3}{32}$

$\text{Since } \frac{3}{11} \neq \frac{3}{32}$

∴ 33, 121, 9, and 96 are in proportion.

$(c)\ 24 \text{ and } 28 = \frac{24}{28} = \frac{24 \div 4}{28 \div 4} = \frac{6}{7}$ $36 \text{ and } 48 = \frac{36}{48} = \frac{36 \div 4}{48 \div 12} = \frac{3}{4}$ $\text{Since } \frac{6}{7} \neq \frac{3}{4}$

∴ 24, 28, 36, and 48 are not in proportion.

$(d)\ 32 \text{ and } 48 = \frac{32}{48} = \frac{32 \div 16}{48 \div 16} = \frac{2}{3}$ $70 \text{ and } 210 = \frac{70}{210} = \frac{70 \div 70}{210 \div 70} = \frac{1}{3}$ $\text{Since } \frac{3}{2} \neq \frac{1}{3}$

∴ 32, 48, 70, and 210 are not in proportion. 4

$(e)\ 4 \text{ and } 6 = \frac{4}{6} = \frac{4 \div 2}{6 \div 2} = \frac{2}{3}$ $8 \text{ and } 12 = \frac{8}{12} = \frac{8 \div 4}{12 \div 4} = \frac{2}{3}$

∴ 4 : 6 :: 8 : 12

∴ 4, 6, 8, and 12 are in proportion.

$(f)\ 33 \text{ and } 44 = \frac{33}{44} = \frac{33 \div 11}{44 \div 11} = \frac{3}{4}$ $75 \text{ and } 100 = \frac{75}{100} = \frac{75 \div 25}{100 \div 25} = \frac{3}{4}$

∴ 33 : 44 : : 75 : 100

∴ 33, 44, 75, and 100 are in proportion.

2. Write True (T) or False (F) against each of the following statements:

(a) 16 : 24 :: 20 : 30 (b) 21 : 6 :: 35 : 10

(c) 12 : 18 :: 28 : 12 (d) 8 : 9 :: 24 : 27

(e) 5.2 : 3.9 :: 3 : 4 (f) 0.9 : 0.36 :: 10 : 4

Ans. (a) 16 : 24 :: 20 : 30

Product of the extreme terms = 16 × 30 = 480

Product of the middle terms = 24 × 20 = 480

∴ The given statement (a) → (T)

(b) 21 : 6 :: 35 : 10

Product of the extreme terms = 21 × 10 = 210

Product of the middle terms = 6 × 35 = 210

∴ The given statement (b) → (T)

(c) 12 : 18 :: 28 : 12

Product of the extreme terms = 12 × 12 = 144

Product of the middle terms = 18 × 28 = 504

Since 144 ≠ 504

∴ The given statement (c) → (F)

(d) 8 : 9 :: 24 : 27

Product of the extreme terms = 8 × 27 = 216

The product of the middle terms = 9 × 24 = 216

The given statement (d) → (T)

(e) 5.2 : 3.9 :: 3 : 4

Product of the extreme terms = 5.2 × 4 = 20.8

Product of the middle terms = 3.9 × 3 = 11.7

Since 20.8 ≠ 11.7

The given statement (e) → (F)

(f) 0.9 : 0.36 :: 10 : 4

Product of the extreme terms = 0.9 × 4 = 3.6

Product of the middle terms = $0.36 \times 10 = 3.6$

∴ The given statement (f) → (T)

3. Are the following statements true?

(a) 40 persons : 200 persons = Π15 : Π75

(b) 7.5 litres : 15 litres = 5 kg : 10 kg

(c) 99 kg : 45 kg = Π44 : Π20

(d) 32 m : 64 m = 6 sec : 12 sec

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

Ans. (a) 40 persons : 200 persons

$= \frac{40}{200} = \frac{40 \div 40}{200 \div 40} = \frac{1}{5}$

$Rs\ 15 : 75 = \frac{15 \div 15}{75 \div 15} = \frac{1}{5}$

∴ Statement (a) is true.

(b) 7.5 liters: 15 liters

$= \frac{7.5}{15} = \frac{75}{150} = \frac{75 \div 75}{150 \div 75} = \frac{1}{2}$

$5\ kg : 10\ kg = \frac{5}{10} = \frac{5 \div 5}{10 \div 5} = \frac{1}{2}$

∴ Statement (b) is true.

$(c)\ 99\ kg : 45\ kg = \frac{99}{45} = \frac{99 \div 9}{45 \div 9} = \frac{11}{5}$

$Rs\ 44 : 20 = \frac{4}{20} = \frac{44 \div 4}{20 \div 4} = \frac{11}{5}$

∴ Statement (c) is true.

$(d)\ 32\ m: 64\ m = \frac{32}{64} = \frac{32 \div 32}{64 \div 32} = \frac{1}{2}$

$6\ \text{sec}\ sec :\ 12\ \text{sec}\ sec = \frac{6}{12} = \frac{6 \div 6}{12 \div 6} = \frac{1}{2}$

∴ Statement (d) is true.

$(e)\ 45\ km : 60\ km = \frac{45}{60} = \frac{45 \div 15}{60 \div 15} = \frac{3}{4}$

$12\ hours : 15\ hours = \frac{12}{15} = \frac{12 \div 3}{15 \div 3} = \frac{4}{5}$

$Since \frac{3}{4} \neq \frac{4}{5}$

∴ Statement (e) is not true.

4. Determine if the following ratios form a proportion. Also, write the middle terms and extreme terms where the ratios form a proportion.

(a) 25 cm : 1 m and ₹ 40 : ₹ 160

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

(c) 2 kg : 80 kg and 25 g : 625 g

(d) 200 mL : 2.5 litres and ₹ 4 : ₹ 50

Ans. (a) 25 cm : 1 m = 25 cm : 100 cm [∵ 1 m = 100 cm]

$$= \frac{25}{100} = \frac{25 \div 25}{100 \div 25} = \frac{1}{2}$$

$$\text{Rs. } 40 : \text{Rs} 160 = \frac{40}{160} = \frac{40 \div 40}{160 \div 40} = \frac{1}{4}$$

∴ The given ratios are in proportion.

Extreme terms are 25 cm and ₹160.

Middle terms are 1 m and ₹ 40.

(b) $$39 \text{ litres} : 65 \text{ litres} = \frac{39}{65} = \frac{39 \div 13}{65 \div 13} = \frac{3}{5}$$

$$6 \text{bottles} : 10 \text{bottles} = \frac{6}{10} = \frac{6 \div 2}{10 \div 2} = \frac{3}{5}$$

∴ The given ratios are in proportion.

Extreme terms are 39 liters and 10 bottles.

Middle terms are 65 liters and 6 bottles.

(c) $$2 \text{ kg} : 80 \text{ kg} = \frac{2}{80} = \frac{2 \div 2}{80 \div 2} = \frac{1}{40}$$

$$25\text{g} : 625 \text{ g} = \frac{25}{625} = \frac{25 \div 25}{625 \div 25} = \frac{1}{25}$$

$$\text{Since } \frac{1}{40} \neq \frac{1}{25}$$

∴ The given ratios are not in proportion.

(d) 200 mL : 2.5 litres = 2.5 litres = 2.5 x 1000 mL = 2500 mL

$$200\ \text{mL} : 2500\ \text{mL} = \frac{200 \div 100}{2500 \div 100} = \frac{2}{25}$$

$$\text{Rs.}\,4 : 50 = \frac{4}{50} = \frac{4 \div 2}{50 \div 2} = \frac{2}{25}$$

$$\text{Since } \frac{2}{25} = \frac{2}{25}$$

∴ The given ratios are in proportion.

Extreme terms are 200 mL and ₹ 50

Middle terms are 2.5 liters and ₹ 4.