Mathematics

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(Chapter - 12) (Ratio and Proportion)
(Class - VI)

Exercise 12.2

**Question 1:**
Determine 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

**Answer 1:**

(a) \(15 : 45 = \frac{15}{45} = \frac{1}{3} = 1 : 3\)

\[40 : 120 = \frac{40}{120} = \frac{1}{3} = 1 : 3\]

Since \(15 : 45 = 40 : 120\)
Therefore, \(15, 45, 40, 120\) are in proportion.

(b) \(33 : 121 = \frac{33}{121} = \frac{3}{11} = 3 : 11\)

\[9 : 96 = \frac{9}{96} = \frac{3}{32} = 3 : 32\]

Since \(33 : 121 \neq 9 : 96\)
Therefore, \(33, 121, 9, 96\) are not in proportion.

(c) \(24 : 28 = \frac{24}{28} = \frac{6}{7} = 6 : 7\)

\[36 : 48 = \frac{36}{48} = \frac{3}{4} = 3 : 4\]

Since \(24 : 28 \neq 36 : 48\)
Therefore, \(24, 28, 36, 48\) are not in proportion.

(d) \(32 : 48 = \frac{32}{48} = \frac{2}{3} = 2 : 3\)

\[70 : 210 = \frac{70}{210} = \frac{1}{3} = 1 : 3\]

Since \(32 : 48 \neq 70 : 210\)
Therefore, \(32, 48, 70, 210\) are not in proportion.

(e) \(4 : 6 = \frac{4}{6} = \frac{2}{3} = 2 : 3\)

\[8 : 12 = \frac{8}{12} = \frac{2}{3} = 2 : 3\]

Since \(4 : 6 = 8 : 12\)
Therefore, \(4, 6, 8, 12\) are in proportion.
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(f) \(33 : 44 = \frac{33}{44} = \frac{3}{4} = 3 : 4\)

\(75 : 100 = \frac{75}{100} = \frac{3}{4} = 3 : 4\)

Since \(33 : 44 = 75 : 100\)
Therefore, \(33, 44, 75, 100\) are in ratio.

**Question 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) \(0.9 : 0.36 :: 10 : 4\)

**Answer 2:**

(a) \(16 : 25 :: 20 : 30\)
\[\Rightarrow \frac{16}{24} = \frac{20}{30}\]
\[\Rightarrow \frac{2}{3} = \frac{2}{3}\]
Hence, it is True.

(b) \(21 : 6 :: 35 : 10\)
\[\Rightarrow \frac{21}{6} = \frac{35}{10}\]
\[\Rightarrow \frac{7}{2} = \frac{7}{2}\]
Hence, it is True.

(c) \(12 : 18 :: 28 : 12\)
\[\Rightarrow \frac{12}{18} = \frac{28}{12}\]
\[\Rightarrow \frac{2}{3} = \frac{7}{3}\]
Hence, it is False.

(d) \(8 : 9 :: 24 : 27\)
\[\Rightarrow \frac{8}{9} = \frac{24}{27}\]
\[\Rightarrow \frac{8}{9} = \frac{8}{9}\]
Hence, it is True.
(e) \(5.2 : 3.9 : : 3 : 4\)
\[\Rightarrow \frac{5.2}{3.9} = \frac{a}{4}\]
\[\Rightarrow \frac{5}{3} = \frac{a}{4}\]
Hence, it is False.
(f) \(0.9 : 0.36 : : 10 : 4\)
\[\Rightarrow \frac{0.9}{0.36} = \frac{10}{4}\]
\[\Rightarrow \frac{5}{2} = \frac{5}{2}\]
Hence, it is True.

**Question 3:**
Are the following statements true:
(a) 40 persons : 200 persons = ₹15 : ₹75
(b) 7.5 litres : 15 litres = 5 kg : 10 kg
(c) 99 kg : 45 kg = ₹44 : ₹20
(d) 32 m : 64 m = 6 sec. : 12 sec.
(e) 45 km : 60 km = 12 hours : 15 hours

**Answer 3:**
(a) 40 persons : 200 persons = \(\frac{40}{200} = \frac{1}{5}\) = 1 : 5
\[\text{₹15 : ₹75} = \frac{15}{75} = \frac{1}{5} = 1 : 5\]
Since, 40 persons : 200 persons = ₹15 : ₹75
Hence, the statement is true.
(b) 7.5 litres : 15 litres = \(\frac{7.5}{15} = \frac{75}{150} = \frac{1}{2}\) = 1 : 2
5 kg : 10 kg = \(\frac{5}{10} = \frac{1}{2}\) = 1 : 2
Since, 7.5 litres : 15 litres = 5 kg : 10 kg
Hence, the statement is true.
(c) 99 kg : 45 kg = \(\frac{99}{45} = \frac{11}{5}\) = 11 : 5
\[\text{₹44 : ₹20} = \frac{44}{20} = \frac{11}{5} = 11 : 5\]
Since, 99 kg : 45 kg = ₹44 : ₹20
Hence, the statement is true.
(d) 32 m : 64 m = \(\frac{32}{64} = \frac{1}{2}\) = 1 : 2
6 sec : 12 sec = \frac{6}{12} = \frac{1}{2} = 1 : 2

Since, 32 m : 64 m = 6 sec : 12 sec
Hence, the statement is true.

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

12 hours : 15 hours = \frac{12}{15} = \frac{4}{5} = 4 : 5

Since, 45 km : 60 km ≠ 12 hours : 15 hours
Hence, the statement is not true.

Question 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 ml and ₹4 : ₹50

Answer 4:

(a) 25 cm : 1 m = 25 cm : (1 x 100) cm = 25 cm : 100 cm = \frac{25}{100} = \frac{1}{4} = 1 : 4

₹40 : ₹160 = \frac{40}{160} = \frac{1}{4} = 1 : 4

Since the ratios are equal, therefore these are in proportion.
Middle terms = 1 m, ₹40 and Extreme terms = 25 cm, ₹160

(b) 39 litres : 65 litres = \frac{39}{65} = \frac{3}{5}

6 bottles : 10 bottles = \frac{6}{10} = \frac{3}{5} = 3 : 5

Since the ratios are equal, therefore these are in proportion.
Middle terms = 65 litres, 6 bottles and Extreme terms = 39 litres, 10 bottles

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

25 g : 625 g = \frac{25}{625} = \frac{1}{25} = 1 : 25

Since the ratios are not equal, therefore these are not in proportion.

(d) 200 ml : 2.5 litres = 200 ml : (25000) litres = 200 ml : 2500 ml = \frac{200}{2500} = \frac{2}{25} = 2 : 25

₹4 : ₹50 = \frac{4}{50} = \frac{2}{25} = 2 : 25

Since the ratios are equal, therefore these are in proportion.
Middle terms = 2.5 litres, ₹4 and Extreme terms = 200 ml, ₹50