

Assignment for Class X

General Direction for students : Whatever be the notes provided , everything must be copied in the Maths copy and then do the homework in the same copy.

Subject : Mathematics

Chapter 7: Ratio and Proportion (Part-2)

Proportion :

- If four quantities are such that the ratio of first to second is the same as the ratio of third to the fourth, the four quantities are said to be in **proportion**

$$\text{i.e. } a:b::c:d \text{ or } \frac{a}{b} = \frac{c}{d} \Rightarrow ad = bc$$

\Rightarrow Product of extremes = Product of means

The term **a** and **d** are called extremes (end terms), while **b** and **c** are called the means (middle terms).

- **Continued proportion :** Three or more quantities are said to be in continued proportion , when the ratio of first and second is equal to the ratio of second and third , and so on .

$$\text{i.e. } a:b :: b:c \text{ or } \frac{a}{b} = \frac{b}{c}$$

Here , b is called mean proportion between a and c , and c is called third proportion to a & b.

Similarly a , b, c, d are in continued proportion if $a:b::b:c::c:d$ or $\frac{a}{b} = \frac{b}{c} = \frac{c}{d}$

- **First proportional** . If a, b and c are in continued proportion , then **a** is called the **first proportional**
- **Third proportional** . If a, b and c are in continued proportion , then **c** is called the **third proportional**
- **Mean proportional** . If a, b and c are in continued proportion , then **b** is called the **mean proportional** of a & c .

Thus , if b is mean proportional to a & c , then $\frac{a}{b} = \frac{b}{c} \Rightarrow b^2 = ac \Rightarrow b = \sqrt{ac}$

Exercise 7.2 Q1ii) 3:x=24:2 find x .

$$\text{Given } 3 : x :: 24 : 2 \Rightarrow \frac{3}{x} = \frac{24}{2}$$

$$\Rightarrow 24x = 6 \Rightarrow x = \frac{1}{4}$$

Exercise 7.2 Q4ii) . Find the mean proportion of $\frac{1}{12}$ and $\frac{1}{75}$

$$\text{The mean proportion of } \frac{1}{12} \text{ and } \frac{1}{75} = \sqrt{\left(\frac{1}{12} \times \frac{1}{75}\right)} = \sqrt{\frac{1}{(2^2 \times 3^2 \times 5^2)}} = \frac{1}{30}$$

Exercise 7.2 Q.20, If x, y, z are in continued proportion, prove that $\frac{(x+y)^2}{(y+z)^2} = \frac{x}{z}$

Given x, y, z are in continued proportion

$$\therefore \frac{x}{y} = \frac{y}{z} \Rightarrow y^2 = xz$$

$$\text{Now, L.H.S.} = \frac{(x+y)^2}{(y+z)^2} = \frac{x^2 + 2xy + y^2}{y^2 + 2yz + z^2}$$

$$\Rightarrow \frac{x^2 + 2xy + xz}{xz + 2yz + z^2} \quad \dots \text{ (using } y^2 = xz \text{)}$$

$$\Rightarrow \frac{x(x + 2y + z)}{z(x + 2y + z)}$$

$$\Rightarrow \frac{x}{z} \text{ as required}$$

L.H.S. = R.H.S

Homework: Q4.iii), Q.5, Q.7, Q.13, Q16.iii), 17ii), Q19.v), Q22.vi), Q23.v)