

## 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-3)

### Properties of proportion

- **Invertendo :** If  $a:b :: c:d$  , then  $b:a :: d:c$
- **Alternendo:** If  $a:b :: c:d$  , then  $a:c :: b:d$
- **Componendo:** If  $a:b :: c:d$  , then  $(a+b):b :: (c+d):d$
- **Dividendo :** If  $a:b :: c:d$  , then  $(a-b):b :: (c-d):d$
- **Componendo and dividendo:** If  $a:b :: c:d$  , then  $(a+b):(a-b) :: (c+d):(c-d)$
- **Convertendo:** If  $a:b :: c:d$  , then  $a:(a-b) :: c:(c-d)$
- If  $\frac{a}{b} = \frac{c}{d} = \frac{e}{f}$  , then each ratio =  $\frac{a+c+e}{b+d+f}$

**Exercise 7.3 Q.1.ii),** If  $a:b::c:d$ , prove that  $\frac{5a+11b}{5c+11d} = \frac{5a-11b}{5c-11d}$ .

$$\text{Given, } \frac{a}{b} = \frac{c}{d}$$

$$\Rightarrow \frac{5a}{11b} = \frac{5c}{11d} \quad \left( \text{Multiply both sides by } \frac{5}{11} \right)$$

$$\Rightarrow \frac{5a+11b}{5a-11b} = \frac{5c+11d}{5c-11d} \quad \left( \text{By componendo and dividendo} \right)$$

$$\Rightarrow \frac{5a+11b}{5c+11d} = \frac{5a-11b}{5c-11d} \quad \left( \text{By invertendo} \right)$$

**Exercise 7.3 Q.8** If  $x = \frac{2ab}{a+b}$ , find the value of  $\frac{x+a}{x-a} + \frac{x+b}{x-b}$ .

$$\text{Given, } x = \frac{2ab}{a+b}$$

$$\Rightarrow \frac{x}{a} = \frac{2b}{a+b} \quad \text{and} \quad \frac{x}{b} = \frac{2a}{a+b}$$

Applying componendo and dividendo on both, we get

$$\Rightarrow \frac{x+a}{x-a} = \frac{2b+(a+b)}{2b-(a+b)} \quad \text{and} \quad \frac{x+b}{x-b} = \frac{2a+(a+b)}{2a-(a+b)}$$

$$\Rightarrow \frac{x+a}{x-a} = \frac{3b+a}{b-a} \text{ and } \frac{x+b}{x-b} = \frac{3a+b}{a-b}$$

$$\begin{aligned} \therefore \frac{x+a}{x-a} + \frac{x+b}{x-b} &= \frac{3b+a}{b-a} + \frac{3a+b}{a-b} \\ &= \frac{3b+a}{b-a} - \frac{3a+b}{b-a} = \frac{(3b+a)-(3a+b)}{b-a} \\ &= \frac{2b-2a}{b-a} = \frac{2(b-a)}{(b-a)} = 2 \end{aligned}$$

Homework: Ex 7.3 Q1iii), Q12 ii), Q13ii) Q18

Chapter test : Q.19, Q.22,

Solution of following questions are discussed in the video link provided to you by school:

EX 7.3. Q1iv) Q.6, Q.7, Q.9, Q.11, Q.16, Q.19, Q.20, Q.21