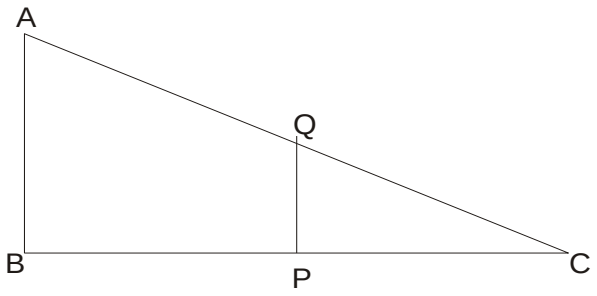
CHAPTER EIGHT
Enlargement, Similarity and Congruence

Enlargement:

Example 1



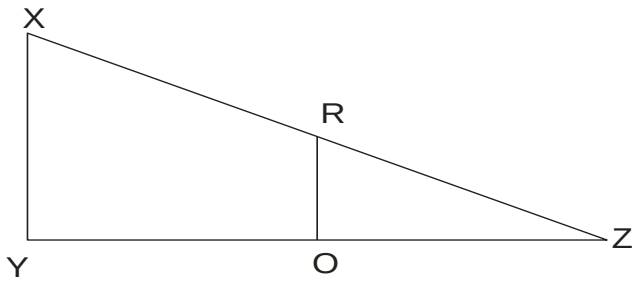
In the given diagram, △ ABC is an enlargement of △ QPC. If |BC| = 12cm and |PC| = 4cm, determine the scale factor.

N/B: Since it was △ QPC which was enlarged to get △ ABC, then △ QPC is the object and △ ABC is the image. Also considering △ QPC, the length PC corresponds with the length BC with reference to △ ABC.

SOLUTION

$$\text{Scale factor} = \frac{\text{Length of image}}{\text{corresponding length of object}} = \frac{BC}{PC} = \frac{12}{4} = 3$$

Example 2



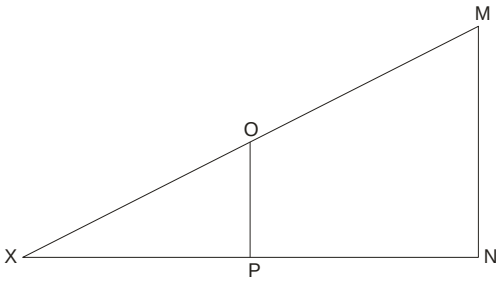
In the given figure, △XYZ underwent an enlargement to give us △ ROZ- Given that |OZ| = 2cm and |YZ|= 6cm, find the scale factor of the enlargement. N/B: Since it was △ XYZ which underwent the enlargement $\Longrightarrow$ △ XYZ is the object and △ ROZ is the image.

Also YZ and OZ are corresponding lengths.

Solution

$$\text{Scale factor} = \frac{\text{Length of image}}{\text{corresponding length of object}} = \frac{OZ}{YZ} = \frac{2}{6} = \frac{1}{3}$$

Example 3



In the given figure, △ XMN is the image of △ XOP after an enlargement.

a. If |OP| = 5cm and |MN| = 15cm, determine the scale factor.
b. If |XP|= 8cm, find |XN|.

Solution

a. OP and MN are corresponding lengths .OP = the length of the object and MN = the corresponding length of the image.

$$\text{Scale factor} = \frac{MN}{OP} = \frac{15}{5} = 3$$

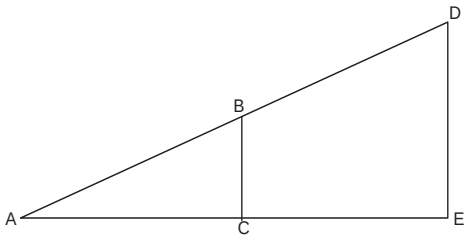
b. Since $\triangle$ XMN is the image $\Longrightarrow$ XN = length of image and XP = length of object.

$$\text{Scale factor} = \frac{\text{Length of image}}{\text{corresponding length of object}}$$

$$\Rightarrow \text{Scale factor} = \frac{XN}{XP} \quad \Rightarrow \text{Scale factor} = \frac{XN}{8}$$

Since the scale factor = 3, then $3 = \frac{XN}{8} =$ => XN = 3 x 8 = 24cm

Example 4



In the given figure,$\triangle$ ADE underwent an enlargement and its image is $\triangle$ ABC.

a. If AB = 3cm and AD = 12cm, find the Scale Factor.

b. If BC = 5cm, determine the length DE.

c. Given that AE = 24cm, what will be the length of AC.

Solution

a. AB and AD are corresponding lengths. Since △ ABC is the image ⟹ AB = length of image and AD = length of object.

$$\text{Scale factor} = \frac{\text{Length of image}}{\text{corresponding length of object}} \Longrightarrow \text{Scale factor} = \frac{AB}{AD} = \frac{3}{12} = \frac{1}{4}$$

b. BC and DE are corresponding lengths, in which BC = the image length, since △ ABC is the image. Also DE = the object length, since △ ADE = the object.

$$\text{Scale factor} = \frac{\text{Length of image}}{\text{corresponding length of object}} \Longrightarrow \text{Scale factor} = \frac{BC}{DE} \Longrightarrow \text{Scale factor} = \frac{5}{DE}$$

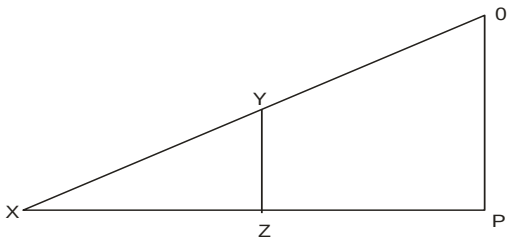
, and since Scale Factor = $\frac{1}{4}$, then $\frac{1}{4} = \frac{5}{DE} \Longrightarrow 1 \times DE = 4 \times 5 \Longrightarrow DE = 20\text{cm}.$

c. AE and AC are corresponding lengths, in which AC = the image lengths and AE = the object length.

$$\therefore \text{Scale factor} = \frac{\text{Length of image}}{\text{corresponding length of object}} \Longrightarrow \text{Scale factor} = \frac{AC}{AE} \Longrightarrow \frac{1}{4} = \frac{AC}{24}$$

$$\Longrightarrow 4\,AC = 1 \times 24 = 24 \Longrightarrow AC = \frac{24}{4} = 6\text{cm}$$

Question 5

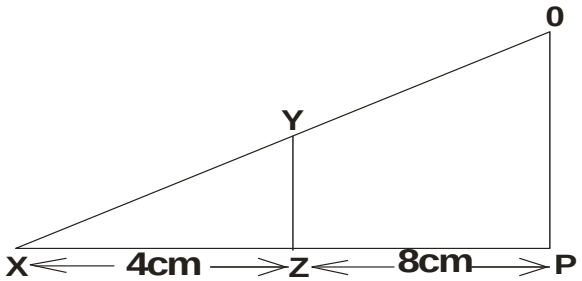


a. In the given figure, △ XYZ was enlarged to get △ XOP. If XZ = 4cm and ZP = 8cm, determine the scale factor

b. If OP = 12cm, find YZ.

Solution

a.



The length XP = 4 + 8 = 12. XZ and XP are corresponding lengths in which XZ = length of object and XP = length of image.

$$\text{Scale factor} = \frac{XP}{XZ} = \frac{12}{4} = 3$$

b. Since $\triangle$ XOP is the image, then OP = image length and YZ = object length.

$$\text{Scale factor} = \frac{OP}{YZ} \Longrightarrow 3 = \frac{12}{YZ} \Longrightarrow 3YZ = 12 \Longrightarrow YZ = \frac{12}{3} = 4\text{cm}$$