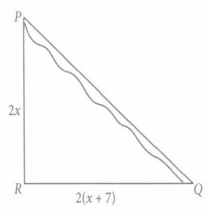
QB365 QUESTION BANK SOFTWARE

10th Maths Important Case Study Questions for Triangles 2024

SECTION A

2 x 4 = 8

1) Minister of a state went to city Q from city P. There is a route via city R such that PR ⊥RQ. PR = 2x km and RQ = 2(x + 7) km. He noticed that there is a proposal to construct a 26 km highway which directly connects the two cities P and Q.



Based on the above information, answer the following questions.

(i) Which concept can be used to get the value of x?

(a) Thales theorem **(b) Pythagoras theorem**

(c) Converse ofthales theorem **(d) Converse of Pythagoras theorem**

(ii) The value of x is

(a) 4 **(b) 6** **(c) 5** **(d) 8**

(iii) The value of PR is

(a) 10 km **(b) 20 km** **(c) 15 km** **(d) 25 km**

(iv) The value of RQ is

(a) 12 km **(b) 24 km** **(c) 16 km** **(d) 20 km**

(v) How much distance will be saved in reaching city Q after the construction of highway?

(a) 10 km **(b) 9 km** **(c) 4 km** **(d) 8 km**

Answer : (i) (b)

(ii) (c): Using Pythagoras theorem, we have $PQ^2 = PR^2 + RQ^2$

$\Rightarrow (26)^2 = (2x)^2 + (2(x+7))^2 \Rightarrow 676 = 4x^2 + 4(x+7)^2$

$\Rightarrow 169 = x^2 + x^2 + 49 + 14x \Rightarrow x^2 + 7x - 60 = 0$

$\Rightarrow x^2 + 12x - 5x - 60 = 0$

$\Rightarrow x(x+12) - 5(x+12) = 0 \Rightarrow (x-5)(x+12) = 0$

$\Rightarrow x = 5, x = -12$

$\therefore \quad x = 5$ [Since length can't be negative]

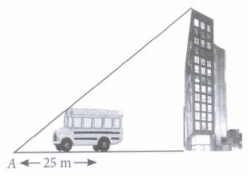
(iii) (a) : PR = 2x = 2 x 5 = 10 km

(iv) (b): RQ= 2(x + 7) = 2(5 + 7) = 24 km

(v) (d): Since, PR + RQ = 10 + 24 = 34 km Saved distance = 34 - 26 = 8 km

2) Aruna visited to her uncle's house. From a point A, where Aruna was standing, a bus and building come in a straight line as shown in the figure.

Based on the above information, answer the following questions.



(i) Which similarity criteria can be seen in this case, if bus and building are considered in a straight line?

(a)	(b)	(c)	(d)
AA	**SAS**	**SSS**	**ASA**

(ii) If the distance between Aruna and the bus is twice as much as the height of the bus, then the height of the bus is

(a)	(b)	(c)	(d)
40 m	**12.5 m**	**15 m**	**20 m**

(iii) If the distance of Aruna from the building is twelve times the height of the bus, then the ratio of the heights of bus and building is

(a)	(b)	(c)	(d)
3:1	**1:4**	**1:6**	**2:3**

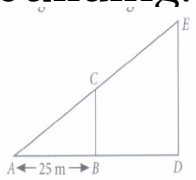
(iv) What is the ratio of the distance between Aruna and top of bus to the distance between the tops of bus and building?

(a)	(b)	(c)	(d)
1:5	**1:6**	**2:5**	**Can't be determined**

(v). What is the height of the building?

(a)	(b)	(c)	(d)
50 m	**75 m**	**120 m**	**30 m**

Answer : Let BC represents the height of bus and DE represents the height of building.



(i) (a) : In ΔABC and ΔADE,

$\angle$A = $\angle$A (Common)

$\angle$B = $\angle$D (Corresponding angles)

$\therefore$ ΔABC $\sim$ ΔADE, (By AA similarity criteria)

(ii) (b): We have, AB = 2BC

$\Rightarrow BC = \frac{25}{2} = 12.5 \text{ m}$

So, height of bus = 12.5 m

(iii) (c) : We have, AD = 12 BC

$\Rightarrow AD = 12 \times 12.5 = 150 \text{ m}$

$\because \Delta ABC \sim \Delta ADE$

$\therefore \frac{AB}{AD} = \frac{BC}{DE} \Rightarrow \frac{BC}{DE} = \frac{25}{150} = \frac{1}{6}$

So, ratio of heights of bus and building is 1 : 6.

(iv) (a): Since, ΔABC $\sim$ ΔADE

$\Rightarrow \quad \frac{AB}{AD} = \frac{AC}{AE} \Rightarrow \frac{AC}{AE} = \frac{1}{6}$

$\Rightarrow \quad \frac{AC}{AE-AC} = \frac{1}{6-1} \Rightarrow \frac{AC}{EC} = \frac{1}{5}$

$\therefore$ Required ratio = 1 : 5

(v) (b): Height of the building = DE

Now, $\frac{BC}{DE} = \frac{1}{6}$

$\Rightarrow \quad DE = 6BC = 6 \times 12.5 = 75 \text{ m}$