3-3.2-15

AI24BTECH11012 - Pushkar Gudla

Question: The construction of a triangle ABC, given that $BC = 6cm, \angle B = 45^\circ$ is not possible when difference of AB and AC is equal to

1) $6.9cm$
2) $5.2cm$
3) $5.0cm$
4) $4.0cm$

Solution: Using the cosine formula in $\triangle ABC$,

Variable	Description
a	Length of side BC
b	Length of side AC
c	Length of side AB
k	$k = b - c$

TABLE 4: Variables Used

$$b^2 = a^2 + c^2 - 2ac\cos B \tag{4.1}$$

$$(k+c)^2 = a^2 + c^2 - 2ac\cos B \tag{4.2}$$

$$\implies c = \frac{a^2 - k^2}{2\left(k + a\cos B\right)} \tag{4.3}$$

$$a = 6cm \tag{4.4}$$

$$\angle B = 45^\circ \tag{4.5}$$

$$c = \frac{36 - k^2}{2\left(k + 3\sqrt{2}\right)} \tag{4.6}$$

$$\tag{4.7}$$

Therefore, $k \leq 6cm$.