

Question-3-3.2-22

EE24BTECH11038 - MALAKALA BALA SUBRAHMANYA ARAVIND

Question:

Write true or false in each of the following. Give reasons for your answer

- 1) A triangle can be constructed in which $\mathbf{AB} = 5\text{cm}$, $\angle A = 45^\circ$ and $\mathbf{BC} + \mathbf{AC} = 5\text{cm}$

Solution:

Given	Values
\mathbf{AB}	5cm
$\angle A$	45°
$\mathbf{AC} + \mathbf{BC}$	5cm

TABLE 1: variables used

By triangle inequality

$$\mathbf{CB} + \mathbf{AC} > \mathbf{AB} \quad (1.1)$$

$$5\text{cm} > 5\text{cm} \quad (1.2)$$

clearly the above statement is False

A triangle can't be constructed

- 2) A triangle can be constructed in which $\mathbf{BC} = 6\text{cm}$, $\angle B = 30^\circ$ and $\mathbf{AC} - \mathbf{AB} = 4\text{cm}$.

Solution:

Given	Values
\mathbf{BC}	6cm
$\angle B$	30°
$\mathbf{AC} - \mathbf{AB}$	4cm

TABLE 2: variables used

Let $\mathbf{AB} = a$ and $\mathbf{AC} = a + 4$

Checking triangle inequalities

$$\mathbf{AB} + \mathbf{BC} > \mathbf{AC} \quad (2.1)$$

$$a + 6 > a + 4 \quad (2.2)$$

$$2 > 0 \quad (2.3)$$

$$\mathbf{AC} + \mathbf{BC} > \mathbf{AB} \quad (2.4)$$

$$a + 4 + 6 > a \quad (2.5)$$

$$10 > 0 \quad (2.6)$$

$$\mathbf{AB} + \mathbf{AC} > \mathbf{BC} \quad (2.7)$$

$$a + a + 4 > 6 \quad (2.8)$$

$$a > 1 \quad (2.9)$$

if $\mathbf{AB} > 1$ a triangle can be constructed

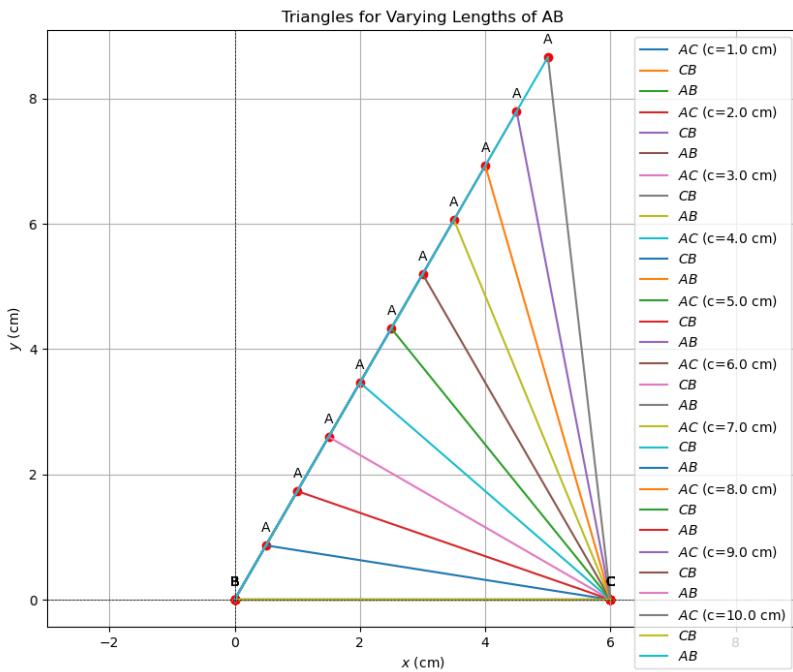


Fig. 2.1: Line \mathbf{AB}

- 3) A triangle can be constructed in which $\angle B = 105^\circ$, $\angle C = 90^\circ$ and $\mathbf{AB} + \mathbf{BC} + \mathbf{AC} = 10\text{cm}$

Solution:

Given	Values
$BC + AB + AC$	10cm
$\angle B$	105°
$\angle C$	90°

TABLE 3: variables used

In a triangle the sum of all interior angles should be equal to 180

$$\angle B + \angle C = 195 \quad (3.1)$$

Therefore a triangle cannot be constructed