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 wich **AB** = $5cm$, $\angle A = 45°$ and **BC** + **AC** = $5cm$
Solution:

Given	Values
AB	$5cm$
$\angle A$	$45°$
AC + **BC**	$5cm$

TABLE 1: variables used

By triangle inequality

$$\mathbf{CB} + \mathbf{AC} > \mathbf{AB} \tag{1.1}$$

$$5cm > 5cm \tag{1.2}$$

clearly the above statement is False
A triangle can't be constructed

2) A triangle can be constructed in which **BC** = $6cm$, $\angle B = 30°$ and **AC** − **AB** = $4cm$.
Solution:

Given	Values
BC	$6cm$
$\angle B$	$30°$
AC − **AB**	$4cm$

TABLE 2: variables used

Let **AB** = a and **AC** = $a + 4$
Checking triangle inequalities

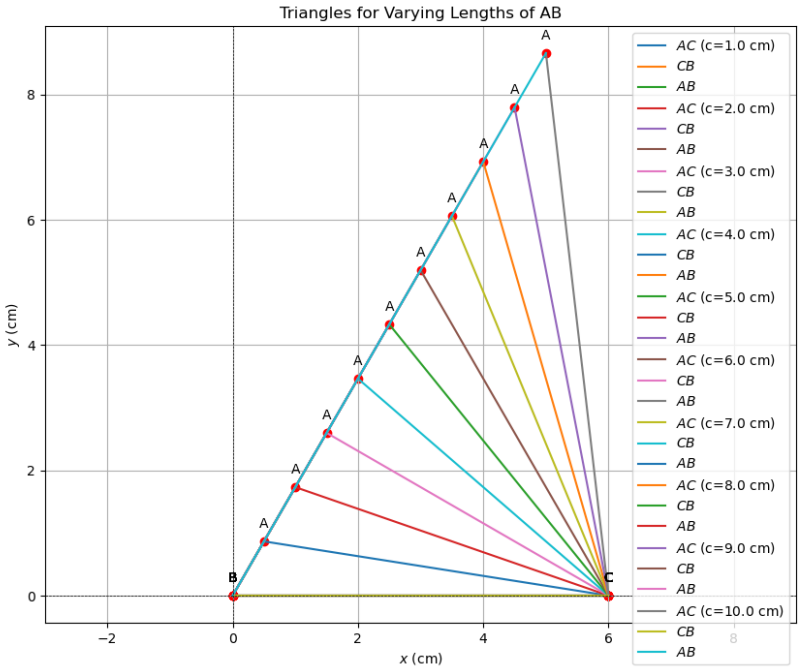

Fig. 2.1: Line **AB**

$$\mathbf{AB} + \mathbf{BC} > \mathbf{AC} \tag{2.1}$$
$$a + 6 > a + 4 \tag{2.2}$$
$$2 > 0 \tag{2.3}$$
$$\mathbf{AC} + \mathbf{BC} > \mathbf{AB} \tag{2.4}$$
$$a + 4 + 6 > a \tag{2.5}$$
$$10 > 0 \tag{2.6}$$
$$\mathbf{AB} + \mathbf{AC} > \mathbf{BC} \tag{2.7}$$
$$a + a + 4 > 6 \tag{2.8}$$
$$a > 1 \tag{2.9}$$

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

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

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

$$\angle B + \angle C = 195 \tag{3.1}$$

Therefore a triangle cannot be constructed