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 0: variables used

By triangle inequality

$$\mathbf{CB} + \mathbf{AC} > \mathbf{AB} \tag{0.1}$$

$$5cm > 5cm \tag{0.2}$$

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 0: variables used

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

$$\mathbf{AB} + \mathbf{BC} > \mathbf{AC} \tag{0.3}$$
$$a + 6 > a + 4 \tag{0.4}$$
$$\implies True \tag{0.5}$$
$$\mathbf{AC} + \mathbf{BC} > \mathbf{AB} \tag{0.6}$$
$$a + 4 + 6 > a \tag{0.7}$$
$$10 > 0 \tag{0.8}$$
$$\implies True \tag{0.9}$$
$$\mathbf{AB} + \mathbf{AC} > \mathbf{BC} \tag{0.10}$$
$$a + a + 4 > 6 \tag{0.11}$$
$$a > 1 \tag{0.12}$$

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

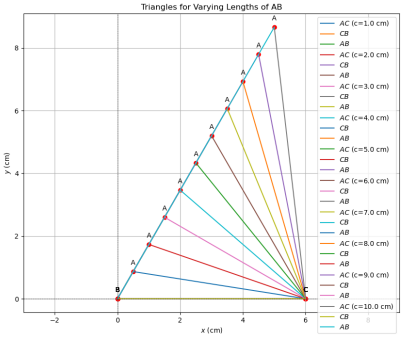

Fig. 0.1: Line **AB**

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
$\mathbf{BC} + \mathbf{AB} + \mathbf{AC}$	$10cm$
$\angle B$	$105°$
$\angle C$	$90°$

TABLE 0: variables used

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

$$\angle B + \angle C = 195 \tag{0.13}$$

Therefore a triangle cannot be constructed