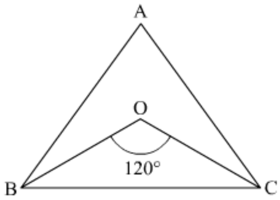
Triangles and Its Angles Ex 9.1 Q10

Answer :

Let ABC be a triangle and BO and CO be the bisectors of the base angle $\angle ABC$ and $\angle ACB$ respectively.



We know that if the bisectors of angles $\angle ABC$ and $\angle ACB$ of a triangle ABC meet at a point O, then

$\angle BOC = 90° + 12\angle A$

$\therefore$ $120° = 90° + 12\angle A \Rightarrow 30° = 12\angle A \Rightarrow \angle A = 60°$

$\angle B$ and $\angle C$ are equal as it is given that $\angle ABC = \angle ACB$.

$\angle A + \angle B + \angle C = 180°$ Sum of three angles of a triangle is $180° \Rightarrow 60°$

$+2\angle B = 180°$ $\because \angle ABC = \angle ACB \Rightarrow \angle B = 60°$

Hence, $\angle A = \angle B = \angle C = 60°$.

Triangles and Its Angles Ex 9.1 Q11

Answer :

(i) Let a triangle ABC has two angles $\angle B$ and $\angle C$ equal to 90^0. We know that sum of the three angles of a triangle is 180°.

$$\angle A + \angle B + \angle C = 180^0$$

$$90^0 + 90^0 + \angle C = 180^0 \qquad [\angle A = 90^0 \ \angle B = 90^0]$$

$$180^0 + \angle C = 180^0$$

$$\angle C = 0$$

Hence, if two angles are equal to 90^0, then the third one will be equal to zero which implies that A, B, C is collinear, or we can say ABC is not a triangle

A triangle can't have two right angles.

(ii) Let a triangle ABC has two obtuse angles $\angle B$ and $\angle C$

This implies that sum of only two angles will be equal to more than 180° which contradicts the theorem sum of all angles in a triangle is always equals 180°.

Therefore, a triangle can't have two obtuse angles.

(iii) Let a triangle ABC has two acute angles $\angle B$ and $\angle C$.

This implies that sum of two angles will be less than 180^0. Hence third angle will be the difference of 180° and sum of both acute angles

Therefore, a triangle can have two acute angles.

(iv) Let a triangle ABC having angles $\angle A$, $\angle B$ and $\angle C$ are more than 60°.

This implies that the sum of three angles will be more than 180° which contradicts the theorem sum of all angles in a triangle is always equals 180°.

Therefore, a triangle can't have all angles more than 60^0.

(v) Let a triangle ABC having angles $\angle A$, $\angle B$ and $\angle C$ are less than 60°.

This implies that the sum of three angles will be less than 180° which contradicts the theorem sum of all angles in a triangle is always equals 180°.

Therefore, a triangle can't have all angles less than 60°.

(vi) Let a triangle ABC having angles $\angle A$, $\angle B$ and $\angle C$ all equal to 60°.

This implies that the sum of three angles will be equal to 180° which satisfies the theorem sum of all angles in a triangle is always equals 180°.

Therefore, a triangle can have all angles equal to 60°.

Triangles and Its Angles Ex 9.1 Q12

Answer :

Let a triangle ABC having angles $\angle A$, $\angle B$ and $\angle C$.

It is given that the sum of two angles are less than third one.

$\angle A < \angle B + \angle C$

We know that the sum of all angles of a triangle equal to 180°.

$$\angle A < \angle B + \angle C$$

$$\angle A + \angle A < \angle A + \angle B + \angle C \qquad [\text{Add } \angle A \text{ both sides}]$$

$$2\angle A < 180 \qquad [\angle A + \angle B + \angle C = 180]$$

$$\angle A < 90$$

Similarly we can prove that $\angle B < 90$ and $\angle C < 90$

Since, all angles are less than 90°.

Hence, triangle is acute angled.

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