Properties of Triangles Ex 15.3 Q15

Answer :

The interior angles of a triangle are the three angle elements inside the triangle.
The exterior angles are formed by extending the sides of a triangle, and if the side of a triangle is produced, the exterior angle so formed is equal to the sum of the two interior opposite angles.

Using these definitions, we will obtain the values of x and y.

(i)

From the given figure, we can see that :

$\angle ACB + x = 180^\circ$ (Linear pair)

$\Rightarrow 75^\circ + x = 180^\circ$

Or,

$x = 105^\circ$

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

Therefore, for $\triangle ABC$, we can say that :

$\angle BAC + \angle ABC + \angle ACB = 180^\circ$

$\Rightarrow 40^\circ + y + 75^\circ = 180^\circ$

Or,

$y = 65^\circ$

(ii)

$x + 80^\circ = 180^\circ$ (Linear pair)

$= x = 100^\circ$

In $\triangle ABC$:

$x + y + 30^\circ = 180^\circ$ (Angle sum property)

$100^\circ + 30^\circ + y = 180^\circ$

$= y = 50^\circ$

(iii)

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

Therefore, for $\triangle ACD$, we can say that :

$30^\circ + 100^\circ + y = 180^\circ$

Or,

$y = 50^\circ$

$\angle ACB + 100^\circ = 180^\circ$

$\angle ACB = 80^\circ \quad \ldots (i)$

Using the above rule for $\triangle ACB$, we can say that :

$x + 45^\circ + 80^\circ = 180^\circ.$

$= x = 55^\circ$

(iv)

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

Therefore, for $\triangle DBC$, we can say that :

$30^\circ + 50^\circ + \angle DBC = 180^\circ$

$\angle DBC = 100^\circ$

$x + \angle DBC = 180^\circ$ (Linear pair)

$x = 80^\circ$

And,

$y = 30^\circ + 80^\circ = 110^\circ$ (Exterior angle property)

********** END **********