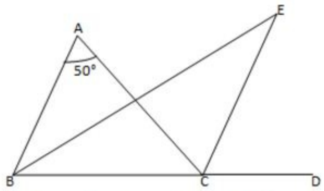
Properties of Triangles Ex 15.2 Q24

Answer :



In the given triangle, $\angle ACD = \angle A + \angle B$. $\left(\text{Exterior angle is equal to the sum of two opposite interior angles.}\right)$

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

Therefore, for the given triangle, we can say that :

$\angle ABC + \angle BCA + \angle CAB = 180^\circ$. $\left(\text{Sum of all angles of } \triangle ABC\right)$

$\angle A + \angle B + \angle BCA = 180^\circ$

$\angle BCA = 180^\circ - \left(\angle A + \angle B\right)$

$\angle ECA = \frac{\angle ACD}{2}$ $\left(\because EC \text{ bisects } \angle ACD\right)$

$\angle ECA = \frac{\angle A + \angle B}{2}$ $\left(\because \angle ACD = \angle A + \angle B\right)$

$\angle EBC = \frac{\angle ABC}{2} = \frac{\angle B}{2}$ $\left(\because EB \text{ bisects } \angle ABC\right)$

$\angle ECB = \angle ECA + \angle BCA$

$\Rightarrow \angle ECB = \frac{\angle A + \angle B}{2} + 180^\circ - \left(\angle A + \angle B\right)$

If we use the same logic for $\triangle EBC$, we can say that :

$\angle EBC + \angle ECB + \angle BEC = 180^\circ$ $\left(\text{Sum of all angles of } \triangle EBC\right)$

$\frac{\angle B}{2} + \frac{\angle A + \angle B}{2} + 180^\circ - \left(\angle A + \angle B\right) + \angle BEC = 180^\circ$

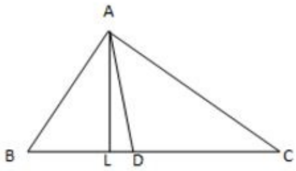
$\angle BEC = \angle A + \angle B - \left(\frac{\angle A + \angle B}{2}\right) - \frac{\angle B}{2}$

$\angle BEC = \frac{\angle A}{2}$

$\Rightarrow \angle BEC = \frac{50^\circ}{2} = 25^\circ$

Properties of Triangles Ex 15.2 Q25

Answer :



We know that the sum of all angles of a triangle is 180°.
Therefore, for $\triangle$ ABC, we can say that :
$\angle A + \angle B + \angle C = 180^\circ$
Or,
$\angle A + 60^\circ + 40^\circ = 180^\circ$
$\Rightarrow \angle A = 80^\circ$
$\angle DAC = \frac{\angle A}{2}$ $\left(\because AD \text{ bisects } \angle A\right)$
$\Rightarrow \angle DAC = \frac{80^\circ}{2} = 40^\circ$
If we use the above logic on $\triangle$ ADC, we can say that :
$\angle ADC + \angle DCA + \angle DAC = 180^\circ$. $\left(\text{Sum of all the angles of } \triangle \text{ ADC}\right)$
$\angle ADC + 40^\circ + 40^\circ = 180^\circ$
$\angle ADC = 180^\circ - 80^\circ = 100^\circ$
$\angle ADC = \angle ALD + \angle LAD$ $\left(\text{Exterior angle is equal to the sum of two Interior opposite angles.}\right)$
$100^\circ = 90^\circ + \angle LAD$ $\left(\because AL \perp BC\right)$
$\angle LAD = 10^\circ$

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