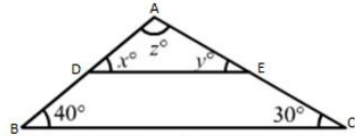




Properties of Triangles Ex 15.2 Q15

Answer :



(i) In $\triangle ABC$ and $\triangle ADE$, we have :

$\angle ADE = \angle ABC$ (corresponding angles)

$$\Rightarrow x^\circ = 40^\circ$$

$\angle AED = \angle ACB$ (corresponding angles)

$$\Rightarrow y^\circ = 30^\circ$$

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

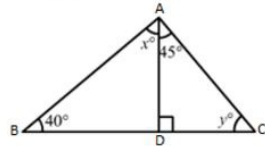
$$\therefore x^\circ + y^\circ + z^\circ = 180^\circ \text{ (Angles of } \triangle ADE)$$

Which means : $40^\circ + 30^\circ + z^\circ = 180^\circ$

$$\Rightarrow z^\circ = 180^\circ - 70^\circ$$

$$\Rightarrow z^\circ = 110^\circ$$

Therefore, we can conclude that the three angles of the given triangle are 40° , 30° and 110° .



(ii) We can see that in $\triangle ADC$, $\angle ADC$ is equal to 90° .

($\triangle ADC$ is a right triangle)

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

Which means : $45^\circ + 90^\circ + y^\circ = 180^\circ$ (Sum of the angles of $\triangle ADC$)

$$\Rightarrow 135^\circ + y^\circ = 180^\circ$$

$$\Rightarrow y^\circ = 180^\circ - 135^\circ$$

$$\Rightarrow y^\circ = 45^\circ$$

We can also say that in $\triangle ABC$, $\angle ABC + \angle ACB + \angle BAC$ is equal to 180° .

(Sum of the angles of $\triangle ABC$)

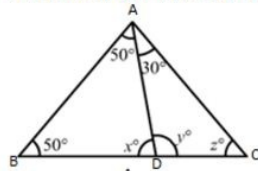
$$\Rightarrow 40^\circ + y^\circ + (x^\circ + 45^\circ) = 180^\circ$$

$$\Rightarrow 40^\circ + 45^\circ + x^\circ + 45^\circ = 180^\circ \quad (\because y^\circ = 45^\circ)$$

$$\Rightarrow x^\circ = 180^\circ - 130^\circ$$

$$\Rightarrow x^\circ = 50^\circ$$

Therefore, we can say that the required angles are 45° and 50° .



(iii) We know that the sum of all the angles of a triangle is equal to 180° .

Therefore, for $\triangle ABD$:

$$\angle ABD + \angle ADB + \angle BAD = 180^\circ \text{ (Sum of the angles of } \triangle ABD)$$

$$\Rightarrow 50^\circ + x^\circ + 50^\circ = 180^\circ$$

$$\Rightarrow 100^\circ + x^\circ = 180^\circ$$

$$\Rightarrow x^\circ = 180^\circ - 100^\circ$$

$$\Rightarrow x^\circ = 80^\circ$$

For $\triangle ABC$:

$$\angle ABC + \angle ACB + \angle BAC = 180^\circ \text{ (Sum of the angles of } \triangle ABC)$$

$$\Rightarrow 50^\circ + z^\circ + (50^\circ + 30^\circ) = 180^\circ$$

$$\Rightarrow 50^\circ + z^\circ + 50^\circ + 30^\circ = 180^\circ$$

$$\Rightarrow z^\circ = 180^\circ - 130^\circ$$

$$\Rightarrow z^\circ = 50^\circ$$

Using the same argument for $\triangle ADC$:

$$\angle ADC + \angle ACD + \angle DAC = 180^\circ \text{ (Sum of angles of } \triangle ADC)$$

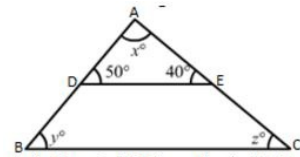
$$\Rightarrow y^\circ + z^\circ + 30^\circ = 180^\circ$$

$$\Rightarrow y^\circ + 50^\circ + 30^\circ = 180^\circ \quad (\because z^\circ = 50^\circ)$$

$$\Rightarrow y^\circ = 180^\circ - 80^\circ$$

$$\Rightarrow y^\circ = 100^\circ$$

Therefore, we can conclude that the required angles are 80° , 50° and 100° .



(iv) In $\triangle ABC$ and $\triangle ADE$:

$$\angle ADE = \angle ABC \text{ (Corresponding angles)}$$

$$\Rightarrow y^\circ = 50^\circ$$

$$\text{Also, } \angle AED = \angle ACB \text{ (Corresponding angles)}$$

$$\Rightarrow z^\circ = 40^\circ$$

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

Which means : $x^\circ + 50^\circ + 40^\circ = 180^\circ$ (Angles of $\triangle ADE$)

$$x^\circ = 180^\circ - 90^\circ$$

$$\Rightarrow x^\circ = 90^\circ$$

Therefore, we can conclude that the required angles are 50° , 40° and 90° .

***** END *****