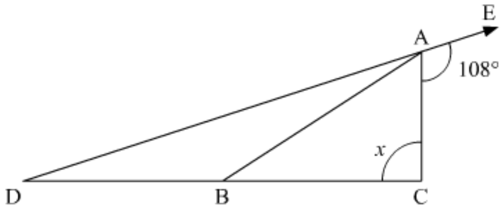
Triangles and Its Angles Ex 9.2 Q5

Answer :

In the given figure, $\angle EAC = 108^\circ$ and $DB = AB$



Since, $DB = AB$ and angles opposite to equal sides are equal. We get,

$\angle BDA = \angle BAD$ 1

Also, EAD is a straight line. So, using the property, "the angles forming a linear pair are supplementary", we get,

$$\angle EAC + \angle DAC = 180^\circ$$
$$\angle DAC + 108^\circ = 180^\circ$$
$$\angle DAC = 180^\circ - 108^\circ$$
$$\angle DAC = 72^\circ$$

Further, it is given AB divides $\angle DAC$ in the ratio 1 : 3.

So, let

$\angle DAB = y,\ \angle BAC = 3y$

Thus,

$y + 3y = \angle DAC$

$\Rightarrow 4y = 72^\circ$

$\Rightarrow y = \frac{72^\circ}{4}$

$\Rightarrow y = 18^\circ$

Hence, $\angle DAB = 18^\circ,\ \angle BAC = 3 \times 18^\circ = 54^\circ$

Using (1)

$\angle BDA = \angle DAB$

$\angle BDA = 18^\circ$

Now, in ΔABC , using the property, "exterior angle of a triangle is equal to the sum of its two opposite interior angles", we get,

$\angle EAC = \angle ADC + x$

$\Rightarrow 108^\circ = 18^\circ + x$

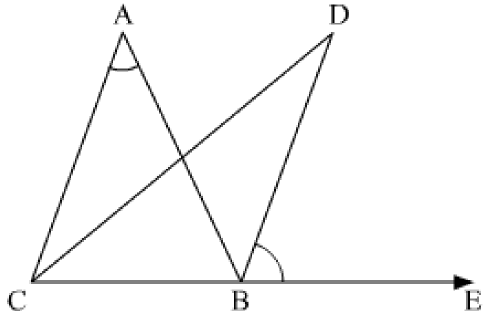
$\Rightarrow x = 90^\circ$

Therefore, $\boxed{x = 90^\circ}$.

Triangles and Its Angles Ex 9.2 Q6

Answer :

In the given ΔABC, the bisectors of $ext.\angle B$ and $\angle C$ intersect at D



We need to prove: $\angle D = \frac{1}{2}\angle A$

Now, using the exterior angle theorem,

∠ABE=∠BAC+∠ACB .....(1)

As ∠ABE and ∠ACB are bisected

∠DCB=12∠ACB

Also,

∠DBA=12∠ABE

Further, applying angle sum property of the triangle

In ΔDCB

$$\angle CDB + \angle DCB + \angle CBD = 180^\circ$$

$$\Rightarrow \angle CDB + \tfrac{1}{2}\angle ACB + (\angle DBA + \angle ABC) = 180^\circ$$

$$\angle CDB + \tfrac{1}{2}\angle ACB + \left(\tfrac{1}{2}\angle ABE + \angle ABC\right) = 180^\circ \quad .....(2)$$

Also, CBE is a straight line, So, using linear pair property

$$\Rightarrow \angle ABC + \angle ABE = 180^\circ$$

$$\Rightarrow \angle ABC + \tfrac{1}{2}\angle ABE + \tfrac{1}{2}\angle ABE = 180^\circ$$

$$\Rightarrow \angle ABC + \tfrac{1}{2}\angle ABE = 180^\circ - \tfrac{1}{2}\angle ABE \quad .....(3)$$

So, using (3) in (2)

$$\angle CDB + \tfrac{1}{2}\angle ACB + \left(180^\circ - \tfrac{1}{2}\angle ABE\right) = 180^\circ$$

$$\Rightarrow \angle CDB + \tfrac{1}{2}\angle ACB - \tfrac{1}{2}\angle ABE = 0$$

$$\Rightarrow \angle CDB = \tfrac{1}{2}(\angle ABE - \angle ACB)$$

$$\Rightarrow \angle CDB = \tfrac{1}{2}\angle CAB$$

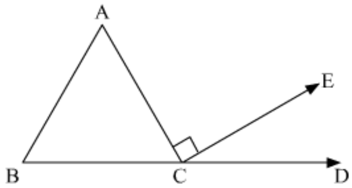
$$\Rightarrow \angle D = \tfrac{1}{2}\angle A$$

Hence proved.

Triangles and Its Angles Ex 9.2 Q7

Answer :

In the given figure, $AC \perp CE$ and $\angle A : \angle B : \angle C = 3:2:1$. We need to find the value of $\angle ECD$



Since,

$\angle A : \angle B : \angle C = 3:2:1$

Let,

$\angle A = 3x$

$\angle B = 2x$

$\angle C = x$

Applying the angle sum property of the triangle, in ΔABC, we get,

$$\angle A + \angle B + \angle C = 180^\circ$$
$$3x + 2x + x = 180^\circ$$
$$6x = 180^\circ$$
$$x = \frac{180^\circ}{6}$$
$$x = 30^\circ$$

Thus,

$\angle A = 3x = 3(30^\circ) = 90^\circ$

$\angle B = 2x = 2(30^\circ) = 60^\circ$

$\angle C = x = 30^\circ$

Further, BCD is a straight line. So, applying the property, "the angles forming a linear pair are supplementary", we get,

$$\angle C + \angle ACE + \angle ECD = 180^\circ$$
$$\angle ECD + 30^\circ + 90^\circ = 180^\circ$$
$$\angle ECD + 120^\circ = 180^\circ$$
$$\angle ECD = 180^\circ - 120^\circ$$
$$\angle ECD = 60^\circ$$

Therefore, $\boxed{\angle ECD = 60^\circ}$.

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