

Angle bisector and proportional parts_7

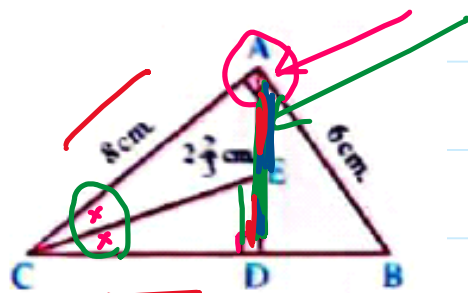
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In the opposite figure :

ABC is a right-angled triangle at A, $\overline{AD} \perp \overline{BC}$

, AB = 6 cm. , AC = 8 cm. , AE = $2\frac{2}{3}$ cm.

Prove that : \overline{CE} bisects $\angle ACD$



$$\therefore BC = \sqrt{AB^2 + AC^2} = \sqrt{6^2 + 8^2}$$

$$\frac{AE}{ED} = \frac{AC}{CD} \quad \checkmark$$

$$BC = 10 \text{ cm}$$

$\therefore AD$ is Altitude

$$\therefore \triangle ADC \sim \triangle BAC$$

$$\therefore \frac{AD}{BA} = \frac{DC}{AC} = \frac{AC}{BC}$$

$$\frac{AD}{6} = \frac{DC}{8} = \frac{8}{10}$$

$$AD = \frac{6 \times 8}{10} = 4.8 \text{ cm}$$

$$DC = \frac{8 \times 8}{10} = 6.4 \text{ cm}$$

$$\therefore AE = 2\frac{2}{3}$$

$$\therefore ED = 4.8 - 2\frac{2}{3} = \frac{32}{15} \text{ cm}$$

$$\therefore \frac{AE}{ED} = \frac{2\frac{2}{3}}{\frac{32}{15}} = \frac{5}{4}$$

From ① & ②

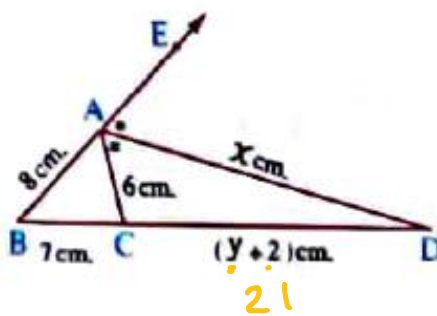
$$\therefore \frac{AC}{CD} = \frac{8}{6.4} = \frac{5}{4}$$

$\therefore CE$ bisect $\angle ACD$

In the opposite figure :

ABC is a triangle in which AB = 8 cm.
 , BC = 7 cm. , AC = 6 cm. , \overline{AD} bisects $\angle A$ externally.

Find the value of each of : X , y



$\therefore \overrightarrow{AD}$ bisects $\angle A$ externally

$$\therefore \frac{BD}{DC} = \frac{BA}{AC} \Rightarrow \frac{y+2+7}{y+2} = \frac{8 \div 2}{6 \div 2} = \frac{4}{3}$$

$$3y + 27 = 4y + 8$$

$$19 = y$$

$$x = \sqrt{AB \cdot AC - BD \cdot CD} = \sqrt{8 \cdot 6 - 28 \cdot 21}$$

internal
bise.

$$= \sqrt{28 \cdot 21 - 8 \cdot 6}$$

external
bise.

ABC is a triangle in which : AB = 27 cm. , AC = 15 cm. , draw \overline{AD} to bisect $\angle A$ and intersect \overline{BC} at D , if BD = 18 cm.

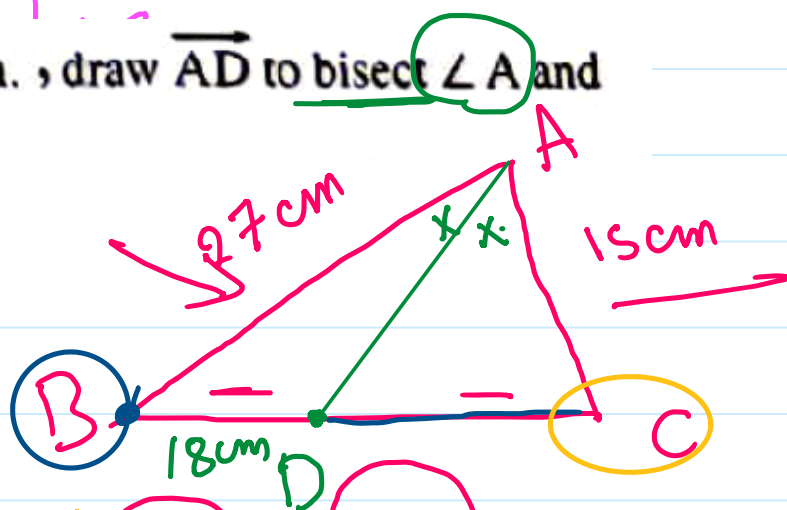
Find the length of : \overline{AD}

$$AD = \sqrt{AB \cdot AC - BD \cdot DC}$$

sides of $\angle A$ sides of base

$$AD = \sqrt{27 \cdot 15 - 18 \cdot 10}$$

$$AD = 15 \text{ cm}$$



$$\frac{BD}{DC} = \frac{BA}{AC}$$

$$\frac{CD}{DB} = \frac{CA}{AB}$$

$$\frac{18}{DC} = \frac{27}{15}$$

$$DC = \frac{15 \cdot 18}{27}$$

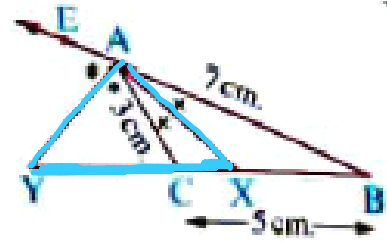
$$DC = 10 \text{ cm}$$

In the opposite figure :

\overline{AX} bisects $\angle BAC$, \overline{AY} bisects $\angle CAE$

, $AB = 7$ cm. , $AC = 3$ cm. , $BC = 5$ cm.

Find the length of : \overline{XY}



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$$\frac{BX}{CX} = \frac{AB}{AC}$$

$$\Rightarrow \frac{m}{5-m} = \frac{7}{3}$$

$$\therefore CX = 5 - 3.5$$

$$CX = 1.5 \text{ cm}$$

$$3m = 35 - 7m$$

$$10m = 35$$

$$m = 3.5 \text{ cm}$$

$$XB = 3.5 \text{ cm}$$

$$\frac{BY}{YC} = \frac{BA}{AC}$$

$$YC = 3.75 \text{ cm}$$

$$\frac{n+5}{n} \neq \frac{7}{3}$$

$$7n = 3n + 15$$

$$\frac{4n}{4} = \frac{15}{4}$$

$$n = \frac{15}{4}$$

$\therefore AX$ angle bis. & AY angle bis

$$\therefore m(\angle YAX) = 90^\circ$$

$\therefore \triangle YAX$ is right.

$$XY^2 = AY^2 + AX^2$$

$$AX = \sqrt{AB \cdot AC - BX \cdot CX} =$$

$$AY = \sqrt{BY \cdot YC - AB \cdot AC}$$