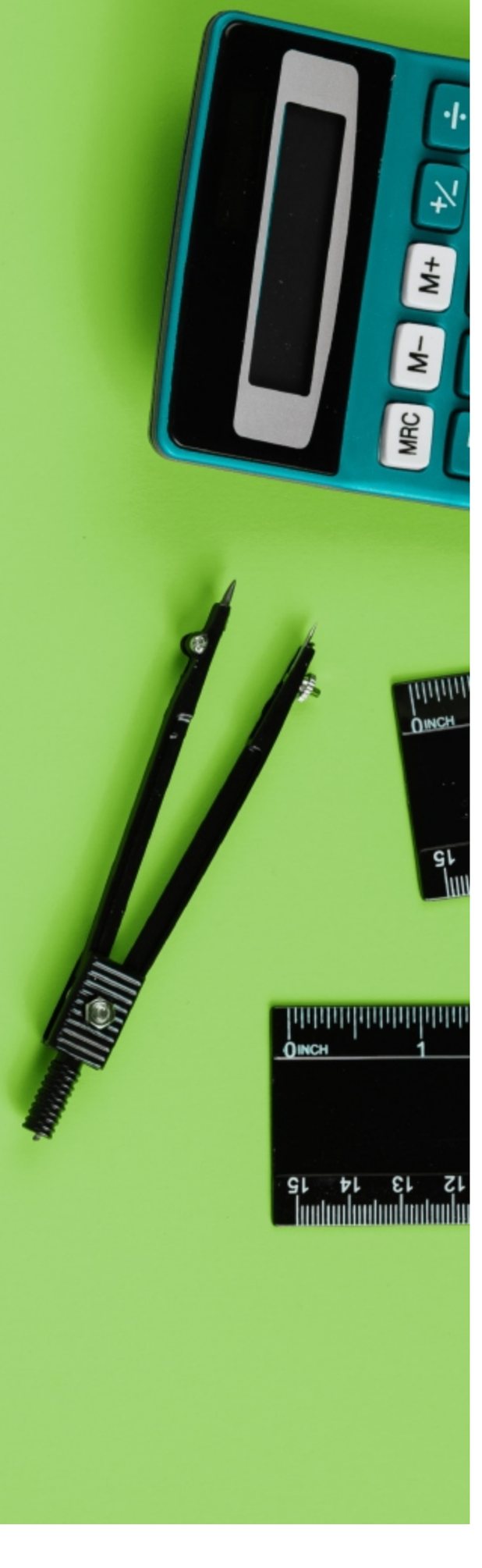
RD Sharma Solutions

Class 7

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Exercise 15.3

Q.1 In fig. 35, $\angle CBX$ is an exterior angle of $\triangle ABC$ at B. Name.

(i) The interior adjacent angle

(ii) The interior opposite angles to exterior $\angle CBX$.

Also, name the interior opposite angles to an exterior angle at A.

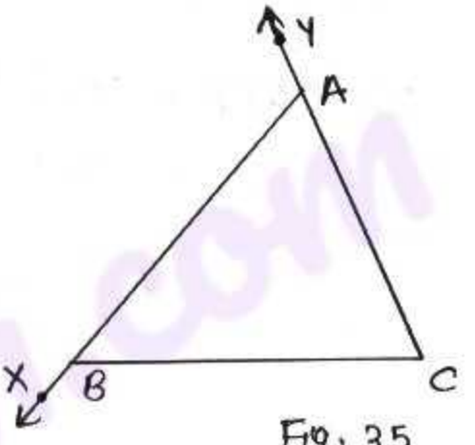


Fig. 35

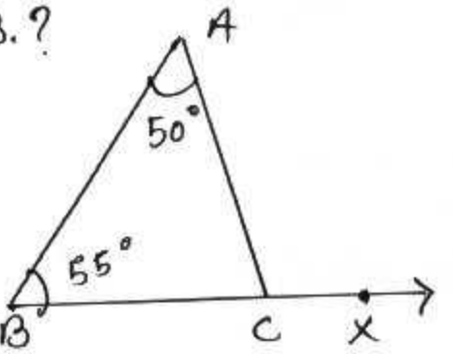
Solution:

(i) Interior adjacent angle of $\angle CBX$ is $\angle ABC$

(ii) Interior opposite angles to $\angle CBX$ are $\angle BAC$ and $\angle ACB$.

Interior opposite angle of $\angle XAY$ are $\angle ABC$ and $\angle ACB$.

Q.2 In fig 36, two of the angles are indicated, what are the measures of $\angle ACX$ and $\angle ACB$.?



Solution:

In $\triangle ABC$

$\because \angle ACX = \angle ABC + \angle BAC$

(Exterior angle property)

$\Rightarrow \angle ACX = 50^\circ + 55^\circ = 105^\circ$

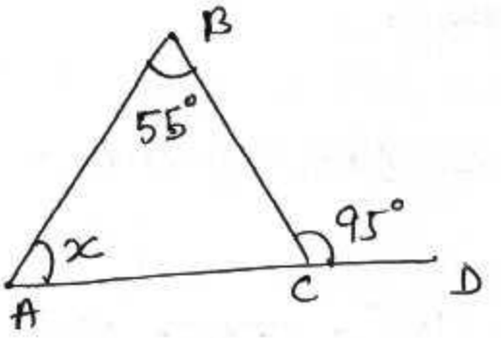
also $\angle ACB = 180^\circ - \angle ACX$ (linear pair)

$= 180^\circ - 105^\circ = 75^\circ$

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Q.3 In a triangle, an exterior angle at a vertex is 95° and its one of the interior opposite angles is 55°. Find all the angles of the triangle.



Solution:

Let other interior opposite angle be x°

then

$$55^\circ + x^\circ = 95^\circ \quad \text{(By exterior angle property)}$$

$$\Rightarrow x = 95^\circ - 55^\circ$$

$$= 40^\circ$$

also $\angle ACB + 95^\circ = 180^\circ$ (linear pair)

$$\Rightarrow \angle ACB = 180 - 95^\circ = 85^\circ.$$

Q.4 One of the exterior angle of a triangle is 80° and the interior opposite angles are equal to each other. What is the measure of each of these two angles.

Solution: We are given, exterior angle $= 80^\circ$

Let interior opposite angles are x° each, then

$$x^\circ + x^\circ = 80^\circ \quad \text{(By exterior angle property)}$$

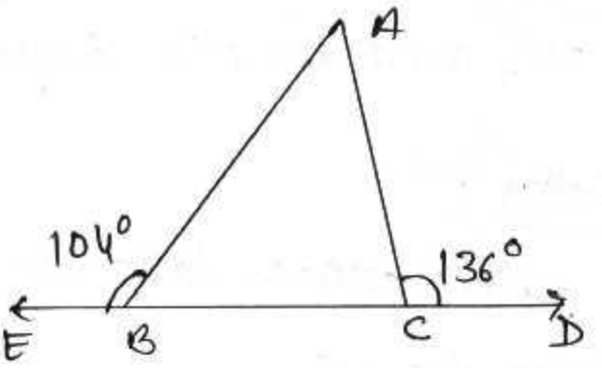
$$\Rightarrow 2x^\circ = 80^\circ$$

$$x = \frac{80}{2} = 40^\circ$$

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Q.5 The exterior angles, obtained on producing the base of a triangle both ways are 104° and 136°. Find all the angles of the triangle.



Solution:

here $\angle ABE + \angle ABC = 180°$ (linear pair)

$\Rightarrow 104° + \angle ABC = 180°$

$\Rightarrow \angle ABC = 180 - 104° = 76°$

also $\angle ACB + \angle ACD = 180°$ (linear pair)

$\Rightarrow \angle ACB + 136° = 180°$

$\angle ACB = 180 - 136°$

$= 44°$

Now In $\triangle ABC$

$\angle ABC + \angle ACB + \angle BAC = 180°$ (Angle sum property)

$\Rightarrow 76° + 44° + \angle BAC = 180°$

$\Rightarrow 120° + \angle BAC = 180°$

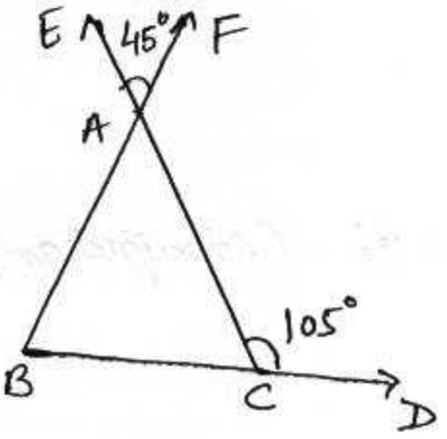
$\Rightarrow \angle BAC = 180° - 120° = 60°$.

Q.6 In fig. 37, the sides BC, CA and BA of $\triangle ABC$ have been produced to D, E and F respectively.

If $\angle ACD = 105°$, $\angle EAF = 45°$, find all the angles of $\triangle ABC$.

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Solution: $\because \angle BAC = \angle EAF = 45^\circ$ (Vertically opposite angles)

$\because \angle A + \angle B = \angle ACD$ (exterior angle property)

$\Rightarrow 45^\circ + \angle B = 105^\circ$

$\Rightarrow \angle B = 105^\circ - 45^\circ$

$= 60^\circ$

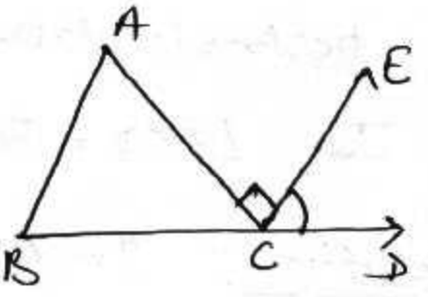
also $\angle ACB + \angle ACD = 180^\circ$ (linear pair)

$\Rightarrow \angle ACB + 105^\circ = 180^\circ$

$\Rightarrow \angle ACB = 180 - 105^\circ = 75^\circ$

Q7 In fig. 38, $AC \perp CE$ and $\angle A : \angle B : \angle C = 3 : 2 : 1$.

Find the value of $\angle ECD$.



Solution: $\because AC \perp CE$

$\Rightarrow \angle ACE = 90^\circ$

Let $\angle A$, $\angle B$ and $\angle C$ are $3x$, $2x$ and x.

$3x + 2x + x = 180^\circ$ (Angle sum property)

$\Rightarrow 6x = 180^\circ \Rightarrow x = 30^\circ$

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$\therefore \angle A = 3x = 3 \times 30^\circ = 90^\circ$.

$\angle B = 2x = 2 \times 30^\circ = 60^\circ$

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

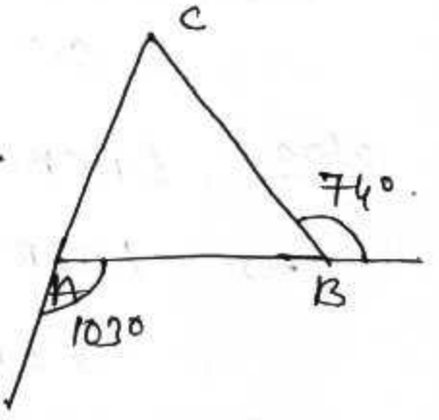
Now, $\angle ACB + \angle ACE + \angle ECD = 180^\circ$ (Straight angle)

$= 30^\circ + 90^\circ + \angle ECD = 180^\circ$

$\Rightarrow 120^\circ + \angle ECD = 180^\circ$

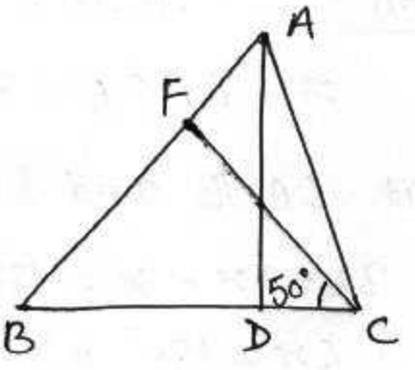
$\Rightarrow \angle ECD = 180 - 120^\circ = 60^\circ$

Q.8 A student when asked to measure two exterior angles of $\triangle ABC$ observed that the exterior angles at A and B are of 103° and 74° respectively. Is this possible? Why or why not?



Solution: Yes, it is possible as sum of all exterior angles of a polygon is 360°.

Q.9 In fig. 39, AD and CF are respectively perpendiculars to sides BC and AB of $\triangle ABC$. If $\angle FCD = 50^\circ$. find $\angle BAD$.



Solution: In $\triangle BFC$,

$\because CF \perp AB$

$\Rightarrow \angle BFC = 90^\circ$

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also, In $\triangle BFC$

$\angle BFC + \angle BCF + \angle B = 180^\circ$ (Angle sum property)

$\Rightarrow 90^\circ + 50^\circ + \angle B = 180^\circ$

$\Rightarrow 140^\circ + \angle B = 180^\circ$

$\Rightarrow \angle B = 180 - 140^\circ = 40^\circ$

Now In $\triangle ABD$, $\because AD \perp BC$

Then $\angle ADB = 90^\circ$

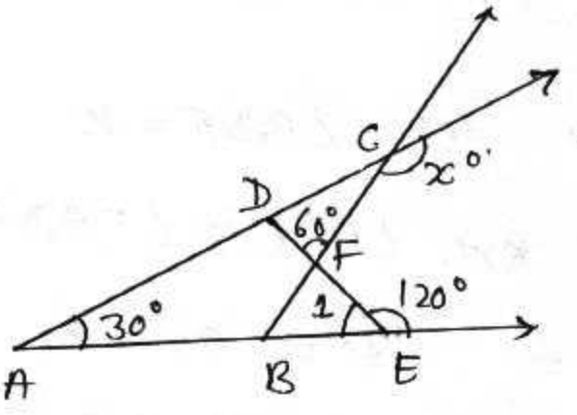
also $\angle B + \angle BAD + \angle ADB = 180^\circ$

$\Rightarrow 40^\circ + \angle BAD + 90^\circ = 180^\circ$ ($\because \angle B = 40^\circ$)

$\Rightarrow 130^\circ + \angle BAD = 180^\circ$

$\Rightarrow \angle BAD = 180 - 130^\circ = 50^\circ$

Q.10 In fig. 40, measure of some angles are indicated find the value of x.



Solution: ~~In $\triangle ADE$~~

Let $\angle BEF = \angle 1$

$\because 120^\circ + \angle 1 = 180^\circ$

$\Rightarrow \angle 1 = 180 - 120^\circ = 60^\circ$

Now In $\triangle ADE$

ext. $\angle CDE = \angle DAE + \angle EAD$ (Exterior angle property)

$\Rightarrow \angle CDE = 30^\circ + 60^\circ$

$= 90^\circ$

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Now In $\triangle DCF$

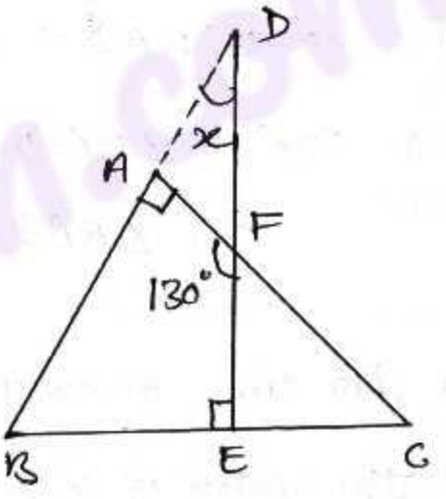
$x = \angle DFC + \angle FDC$ { Exterior angle prop }

$= 60° + 90°$

$x = 150°$

Q.11 In fig. 41, ABC is a right triangle right angled at A. D lies on BA produced and $DE \perp BC$. intersecting AC at F. If $\angle AFE = 130°$. find

(I) $\angle BDE$ (II) $\angle BCA$ (III) $\angle ABC$



Solution:

here $\angle A = 90°$.

$\because DE \perp BC$

$\therefore \angle DEB = \angle DEC = 90°$

also $\angle AFE = 130°$

(I) Let $\angle BDE = x$

ext. $\angle AFE = \angle FAD + x$ (ext. $\angle$s property)

$\Rightarrow 130° = 90° + x$.

$\Rightarrow x = 130° - 90° = 40°$

(II) In $\triangle DBE$

$\angle B + x + \angle BED = 180°$ (Angle sum property)

$\Rightarrow \angle B + 40° + 90° = 180$

$\angle B = 180° - 130° = 50°$

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Now In $\triangle ABC$

$\angle A + \angle B + \angle C = 180^\circ$ (Angle sum property)

$\Rightarrow 90^\circ + 50^\circ + \angle C = 180^\circ$

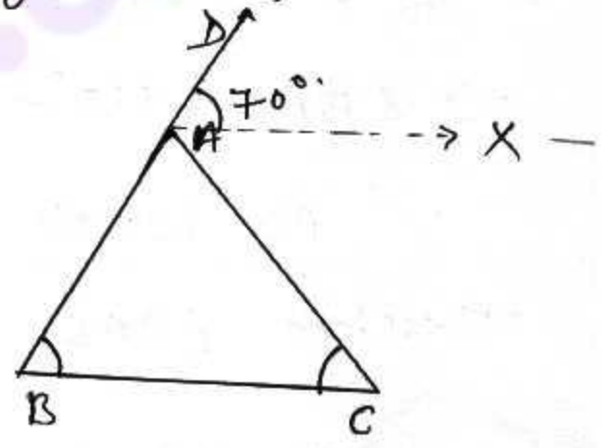
$\Rightarrow 140^\circ + \angle C = 180^\circ$

$\Rightarrow \angle C = 40^\circ$

$\therefore \angle BCA = 40^\circ$

(iii) $\angle ABC = 50^\circ$ (already found in part II)

Q.12 ABC is a triangle in which $\angle B = \angle C$ and ray AX bisects the exterior angle DAC. If $\angle DAX = 70^\circ$ find $\angle ACB$.



Solution:

$\because$ AX bisects $\angle DAC$

hence $\angle DAC = 2 \times 70^\circ$

$= 140^\circ$

also $\angle DAC = \angle B + \angle C$ (exterior angle property)

$\Rightarrow 140^\circ = 2\angle B \quad \{\because \angle B = \angle C\}$

$\Rightarrow \angle C = \frac{140}{2} = 70^\circ$

$\therefore \angle ACB = 70^\circ$

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