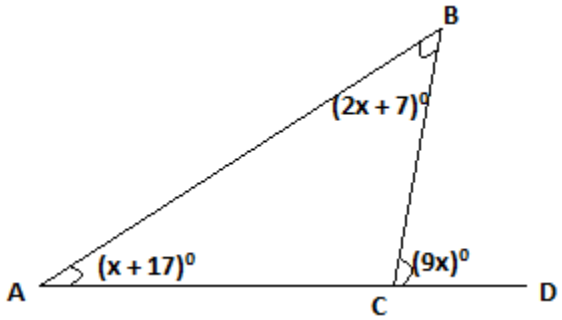
CHAPTER TEN

GEOMETRY

(Q1)



The diagram is triangle ABC with the side AC produced to D. Find.

(i) the value of x.

(ii) the angle ACB.

N/B: The angles mark $(x + 17^0)$ and $(2x + 7)^0$ are the interior opposite angles, while the one marked $(9x)^0$ is the exterior angle.

Soln:

(i) Since the sum of the interior opposite angles = the exterior angle,

$\Rightarrow (x + 17)^0 + (2x + 7) = 9x,$

$\Rightarrow 3x + 24 = 9x, \Rightarrow 24 = 9x - 3x$

$\Rightarrow 6x = 24, \Rightarrow x = \frac{24}{6} = 4.$

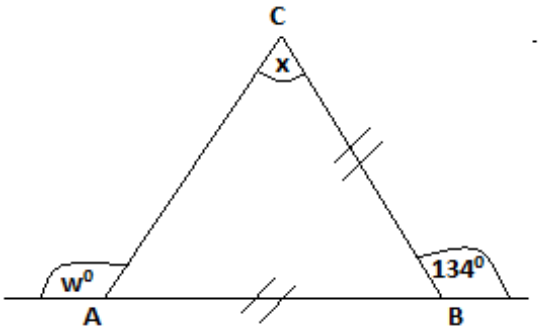
(ii) The value of the angle marked $x + 17 = 4 + 17 = 21^0$ and that marked $2x + 7 = 2(4) + 7 = 8 + 7 = 15^0$.

Let $\angle ACB = y^0$. Since the sum of angles within a triangle $= 180^0$, then $15 + 21 + y$

$= 180^0, \Rightarrow 36^0 + y = 180$

$\Rightarrow y = 180 - 36^0 = 144^0.$

(Q2) Find the value of x and w in the next diagram in which |AB| = |BC|.



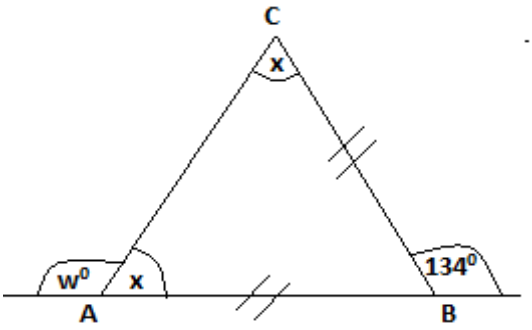
Not drawn to scale.

N/B: Since the two equal sides or lines i.e AB and BC meet the line AC at the points A and C, then the angles at A and C must be equal

Soln:

Since |AB| = |BC| =><ACB = < CAB = x.

i.e.



Since the sum of the interior opposite angles = the exterior angle, then x + x = 134,

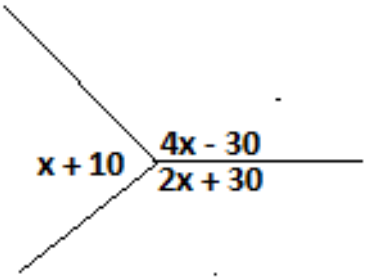
=>2x = 134 => x = $\frac{134}{2}$ = 67^0.

Also w and x are angles on a straight line and since the sum of the angles on a straight line

= 180^0, => w + x = 180,

=> w + 67 = 180, => w = 180 – 67= 113^0.

(Q3) Determine the value of x for this given diagram.



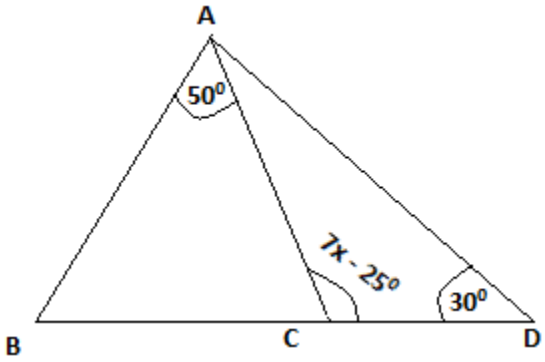
Soln

Since the sum of angles within a circle = 360, then x + 10 + 4x – 30 + 2x + 30 = 360,

=> x + 4x + 2x = 360 – 10 + 30 – 30

=>7x = 350, => x = $\frac{350}{7} = 50^0$.

(Q4)



In the diagram |AB| = |AC|, angle ADC = 30^0 and angle ACD = 7x – 25^0. Find

(i) the value of x.

(ii) angle DAC

(iii) angle BAD.

Since the two equal lines i.e AB and AC meet the line BC at the points B and C, then the angles at B and C are equal.,

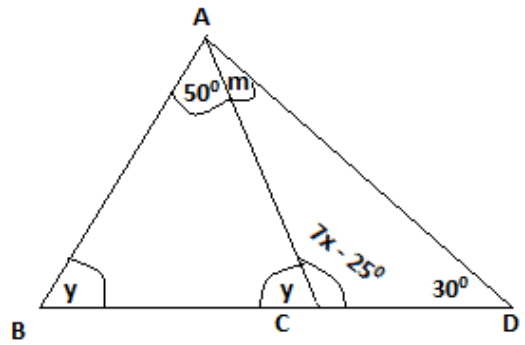
Soln:

(i) Since |AB| = |AC|,

then <ABC = < ACB.

Let angle <ABC = y and <ACB = y

i.e.



Now consider triangle ABC.

Considering <ABC and since the sum of angles within a triangle = 180^0, then 50 + y + y = 180 = > 50 + 2y = 180^0, => 2y = 180 – 50, => 2y = 130 => y = $\frac{130}{2}$ = 65^0.

Also for the same triangle, the sum of the interior opposite angles = the exterior angle which is 7x – 25,

=> 50 + y = 7x – 25,=> 50 + 65 = 7x – 25

=>115 = 7x – 25, => 115 + 25 = 7x,

=>140 = 7x => x = $\frac{140}{7} = 20^0$.

(ii) Since x = 20^0, then the angle marked 7x – 25 = 7(20) – 25 = 140 – 25 = 115^0.

Let <DAC = m and consider ΔACD.

Since the sum of angles within a triangle = 180^0, then m + 115 + 30 = 180,

=> m + 145 = 180 => m = 180 – 145 = 35^0.

∴<DAC = 35^0.

(ii) <BAD = 50^0 + m = 50^0 + 35^0 = 85^0.