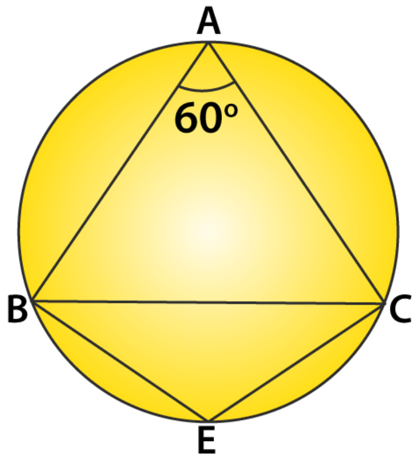
Exercise 16.5 Page No: 16.83

Question 1: In figure, ΔABC is an equilateral triangle. Find m∠BEC.



Solution:

ΔABC is an equilateral triangle. (Given)

Each angle of an equilateral triangle is 60 degrees.

In quadrilateral ABEC:

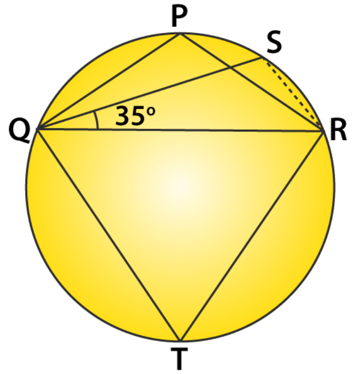
$\angle BAC + \angle BEC = 180^o$ (Opposite angles of quadrilateral)

$60^o + \angle BEC = 180^o$

$\angle BEC = 180^o - 60^o$

$\angle BEC = 120^o$

Question 2: In figure, Δ PQR is an isosceles triangle with PQ = PR and m∠PQR=35°. Find m∠QSR and m∠QTR.



Solution:

Given: ΔPQR is an isosceles triangle with PQ = PR and m∠PQR = 35°

In ΔPQR:

∠PQR = ∠PRQ = 35° (Angle opposite to equal sides)

Again, by angle sum property

∠P + ∠Q + ∠R = 180°

∠P + 35° + 35° = 180°

∠P + 70° = 180°

∠P = 180° - 70°

∠P = 110°

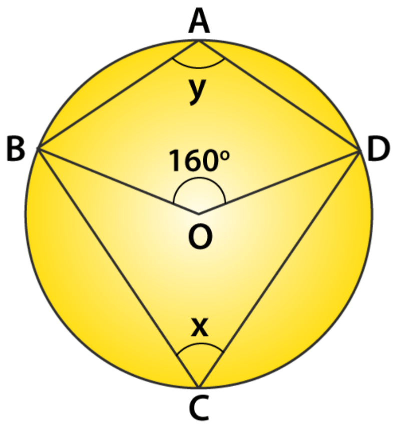
Now, in quadrilateral SQTR,

∠QSR + ∠QTR = 180° (Opposite angles of quadrilateral)

110° + ∠QTR = 180°

∠QTR = 70°

Question 3: In figure, O is the centre of the circle. If ∠BOD = 160°, find the values of x and y.



Solution:

From figure: ∠BOD = 160°

By degree measure theorem: ∠BOD = 2 ∠BCD

160° = 2x

or x = 80°

Now, in quadrilateral ABCD,

∠BAD + ∠BCD = 180° (Opposite angles of Cyclic quadrilateral)

y + x = 180°

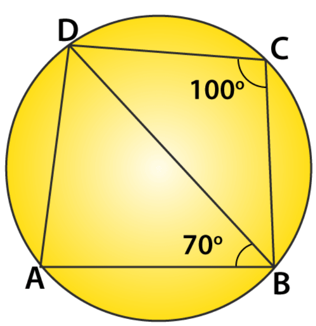
Putting value of x,

y + 80° = 180°

y = 100°

Answer: x = 80° and y = 100°.

Question 4: In figure, ABCD is a cyclic quadrilateral. If ∠BCD = 100° and ∠ABD = 70°, find ∠ADB.



Solution:

From figure:

In quadrilateral ABCD,

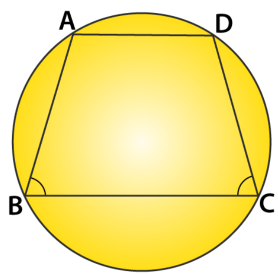
∠DCB + ∠BAD = 180° (Opposite angles of Cyclic quadrilateral)

100° + ∠BAD = 180°

$\angle BAD = 80^0$

In Δ BAD:
By angle sum property: $\angle ADB + \angle DAB + \angle ABD = 180^o$
$\angle ADB + 80^o + 70^o = 180^o$
$\angle ADB = 30^o$

Question 5: If ABCD is a cyclic quadrilateral in which AD||BC (figure). Prove that ∠B = ∠C.



Solution:

Given: ABCD is a cyclic quadrilateral with AD ∥ BC

=> $\angle A + \angle C = 180^o$ ....(1)

[Opposite angles of cyclic quadrilateral]

and $\angle A + \angle B = 180^o$ ....(2)

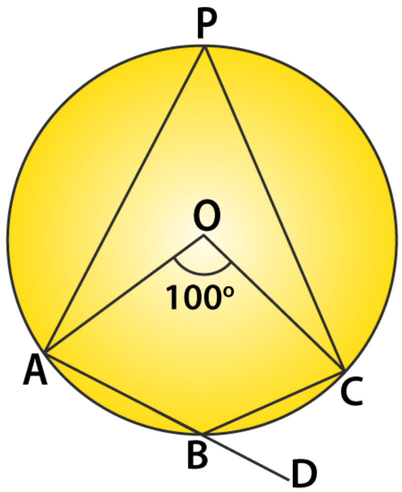
[Co-interior angles]

Form (1) and (2), we have

$\angle B = \angle C$

Hence proved.

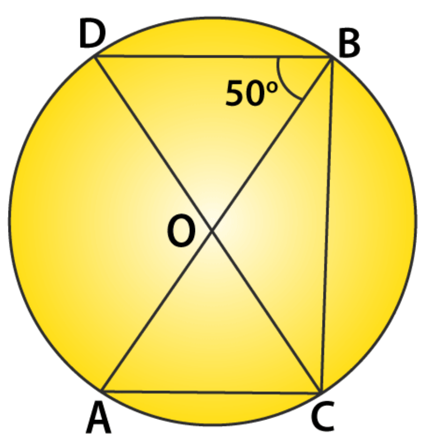
Question 6: In figure, O is the centre of the circle. Find ∠CBD.



Solution:
Given: ∠BOC = 100°
By degree measure theorem: ∠AOC = 2 ∠APC
100 ° = 2 ∠APC
or ∠APC = 50 °
Again,
∠APC + ∠ABC = 180 ° (Opposite angles of a cyclic quadrilateral)
50° + ∠ABC = 180 °
or ∠ABC = 130 °

Now, ∠ABC + ∠CBD = 180 ° (Linear pair)
130° + ∠CBD = 180 °
or ∠CBD = 50 °

Question 7: In figure, AB and CD are diameters of a circle with centre O. If ∠OBD = 50°, find ∠AOC.



Solution:

Given: ∠OBD = 50^0
Here, AB and CD are the diameters of the circles with centre O.
∠DBC = 90^0 ....(i)
[Angle in the semi-circle]

Also, ∠DBC = 50^0 + ∠OBC
90^0 = 50^0 + ∠OBC
or ∠OBC = 40^0

Again, By degree measure theorem: ∠AOC = 2 ∠ABC
∠AOC = 2∠OBC = 2 x 40^0 = 80^0

Question 8: On a semi-circle with AB as diameter, a point C is taken, so that m(∠CAB) = 30^0. Find m(∠ACB) and m(∠ABC).

Solution:
Given: m(∠CAB)= 30^0

To Find: m(∠ACB) and m(∠ABC).
Now,
∠ACB = 90^0 (Angle in semi-circle)
Now,
In △ABC, by angle sum property: ∠CAB + ∠ACB + ∠ABC = 180^0
30^0 + 90^0 + ∠ABC = 180^0
∠ABC = 60^0
Answer: ∠ACB = 90^0 and ∠ABC = 60^0

Question 9: In a cyclic quadrilateral ABCD if AB||CD and ∠B = 70^o , find the remaining angles.

Solution:

A cyclic quadrilateral ABCD with AB||CD and B = 70^o.
∠B + ∠C = 180^o (Co-interior angle)
70^0 + ∠C = 180^0
∠C = 110^0
And,
=> ∠B + ∠D = 180^0 (Opposite angles of Cyclic quadrilateral)
70^0 + ∠D = 180^0
∠D = 110^0

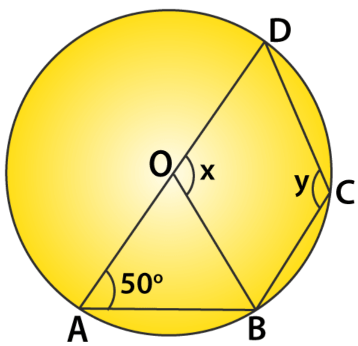
Again, $\angle A + \angle C = 180^0$ (Opposite angles of cyclic quadrilateral)
$\angle A + 110^0 = 180^0$
$\angle A = 70^0$
Answer: $\angle A = 70^0$, $\angle C = 110^0$ and $\angle D = 110^0$

Question 10: In a cyclic quadrilateral ABCD, if m ∠A = 3(m∠C). Find m ∠A.
Solution:
$\angle A + \angle C = 180^o$ .....(1)
[Opposite angles of cyclic quadrilateral]
Since m ∠A = 3(m∠C) (given)
=> $\angle A = 3\angle C$ ...(2)

Equation (1) => $3\angle C + \angle C = 180^o$
or $4\angle C = 180^o$
or $\angle C = 45^o$

From equation (2)
$\angle A = 3 \times 45^o = 135^o$

Question 11: In figure, O is the centre of the circle ∠DAB = 50°. Calculate the values of x and y.



Solution:
Given : $\angle DAB = 50^o$
By degree measure theorem: $\angle BOD = 2\angle BAD$
so, $x = 2(50^0) = 100^0$

Since, ABCD is a cyclic quadrilateral, we have

$\angle A + \angle C = 180^0$

$50^0 + y = 180^0$

$y = 130^0$