24/8/2020
Monday

MATHEMATICS

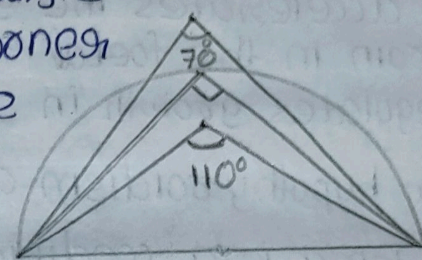
STD:10
Class:22

Text book page no.42,43,44
question Answers

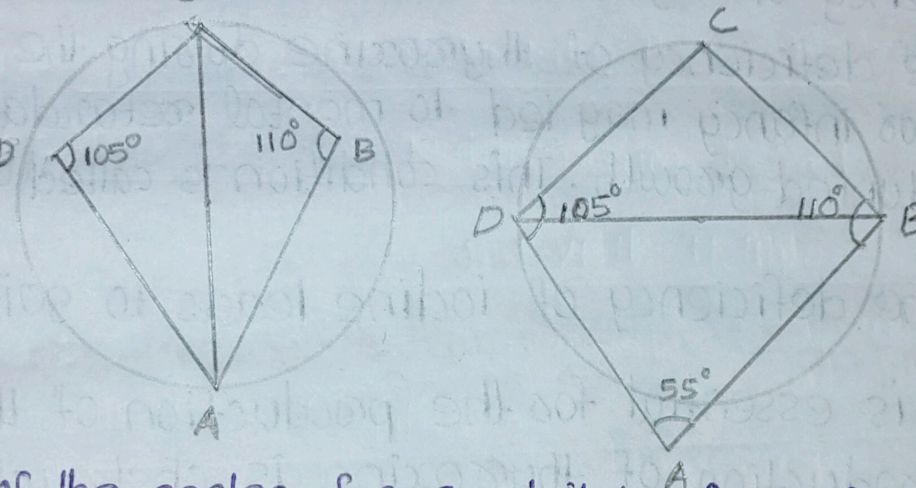
Textbook page no. 42

1. Ans)

The corner with angle 110° is inside the circle, the corner with angle ~~60~~ 90° is on the circle and the corner with angle 70° is outside the circle.



2. Ans)



Sum of the angles of a quadrilateral $= 360^\circ$

$\therefore \angle C = 360 - (105 + 55 + 110) = 360 - 270 = \underline{\underline{90^\circ}}$

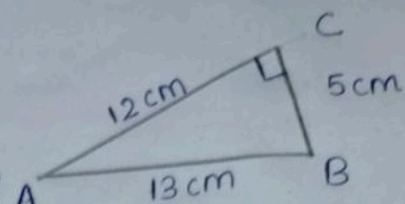
If we draw a circle with the diagonal AC as diameter, the corners B and D will be inside the circle. [These angles are greater than 90°.]

If we draw a circle with the diagonal DB as diameter the corner A will be outside the circle and the corner C will be on the circle.

3. Ans) $5^2 = 25$, $12^2 = 144$

$5^2 + 12^2 = 25 + 144 = 169$

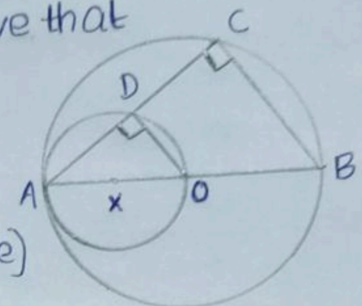
$13^2 = 169$



Since the sum of the squares of two sides is equal to the square of the third side, it is a right triangle. The length of its hypotenuse = 13 cm.

In ΔABC, $\angle C = 90°$. The measure of other angles are less than 90°. If a circle is drawn with the 13 cm side as diameter, the third corner of the triangle will be on the circle. If a circle is drawn with the 12 cm side as diameter or the 5 cm side as diameter, the third corner of the triangle will be outside the circle.

4. Ans) In the figure we have to prove that $AD = DC$. If $AO = x$, $AB = 2x$



In ΔADO and ΔACB,

$\angle ADO = \angle ACB = 90°$ (angle in a semicircle)

$\angle A = \angle A$ [common]

$\therefore \angle AOD = \angle ABC$ [since two angles of the triangles are equal, their third angle also equal.]

Since three angles of ΔADO are equal to three angles of ΔACB, these triangles are similar.

Since the sides of similar triangles are proportional,

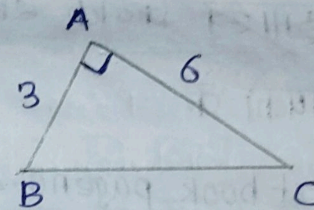
$$\frac{AO}{AB} = \frac{AD}{AC}$$

$$\frac{x}{2x} = \frac{AD}{AC}, \quad \frac{1}{2} = \frac{AD}{AC}, \quad AC = \underline{\underline{2AD}}$$

i.e. That is the point D is the midpoint of AC.

$$\therefore \underline{\underline{AD = DC}}.$$

5. Ans) The square corner of the set square is on a point on the circle. So the angle at that point is 90°. Since the numbers 3 and 6 are on the circle, the line BC joining them is the diameter of the circle.



Using Pythagoras theorem,

$$BC = \sqrt{3^2+6^2} = \sqrt{9+36} = \sqrt{45} = 6.71$$

Radius of the circle, $r = \frac{6.71}{2} = 3.36$ cm

Perimeter of the circle $= 2\pi r = 2 \times 3.14 \times 3.36$

$= \underline{\underline{21.10}}$ cm

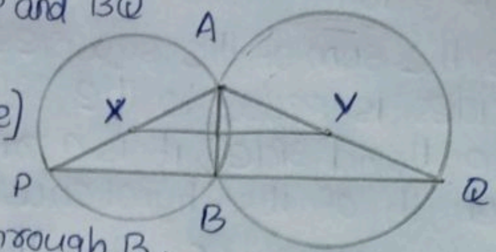
$\therefore$ Area of the circle $= \pi r^2$

$= 3.14 \times 3.36 \times 3.36$

$= \underline{\underline{35.45 \text{ cm}^2}}$

Text book page no. 43

6. Ans) i) Draw the lines BP and BQ



$\angle ABP = \angle ABQ = 90°$
(angle in a semicircle)

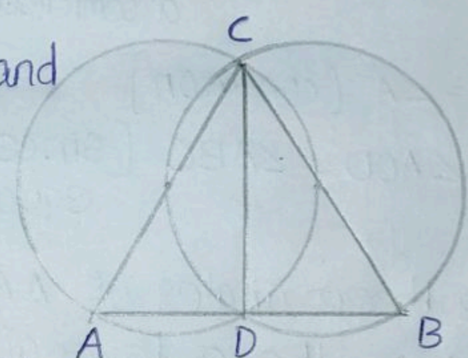
$\therefore$ PQ is a line perpendicular to AB and passing through B.
So P, B and Q are on a line.

ii) Let the centre of the circle with AP as diameter be x and that of the circle with AQ as diameter be y.

x is the midpoint of AP and y is the midpoint of AQ. The line joining the midpoints of two sides of a triangle is parallel to the third side and half of it. $\therefore$ PQ is parallel to xy.

$xy = \frac{1}{2} PQ$ OR $PQ = 2xy$

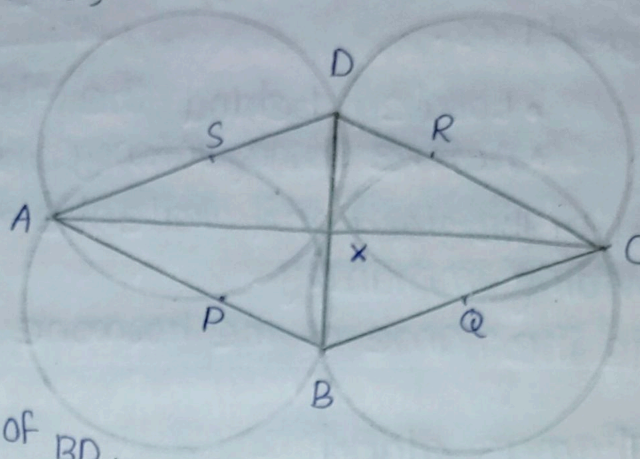
7. Ans) ΔABC is an isosceles triangle in which AC and BC are equal.



Draw CD perpendicular to AB. Since $\angle ADC$ and $\angle BDC$ are $90°$ each, the circles with AC and BC as diameters will pass through the point D.
Since ΔABC is isosceles, D is the midpoint of AB.

$\therefore$ The circles drawn on the two equal sides of an isosceles triangle as diameters passes through the midpoint of the third side.

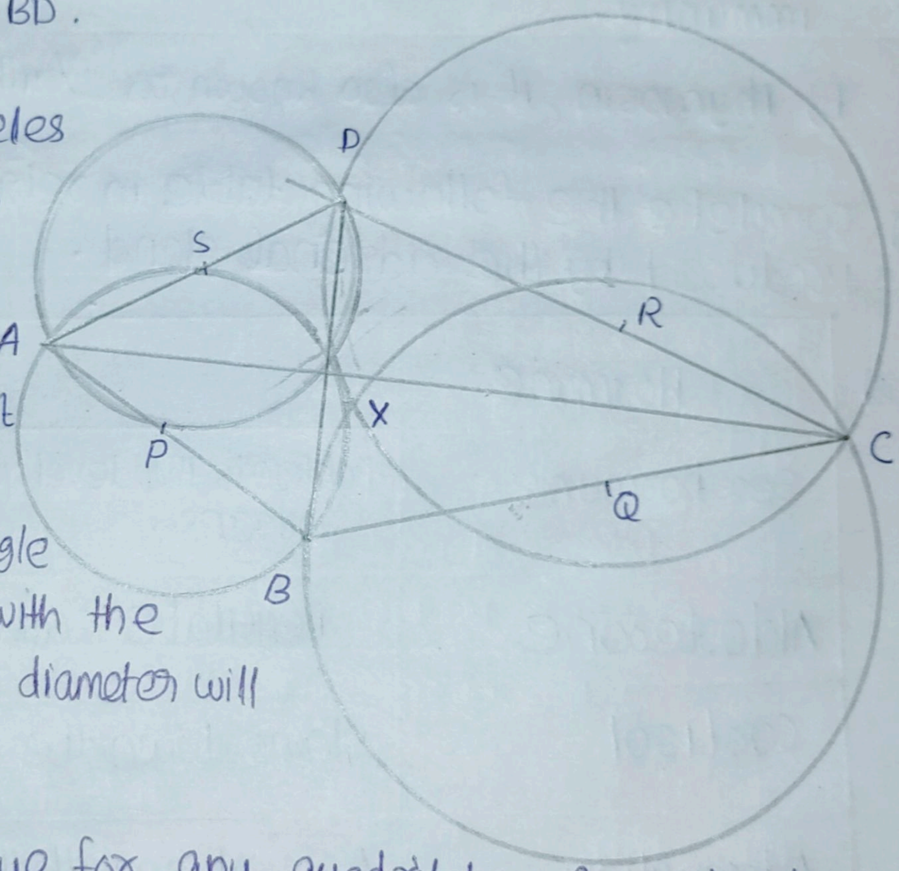
8. Ans) i) In the rhombus ABCD,



$AB = BC = CD = AD$.
Draw AC and BD.
ΔABD is an isosceles triangle. Circles drawn with the sides AB and AD as diameter will pass through X, the midpoint of BD.

ΔCBD is also isosceles. Circles drawn with the sides CB and CD as diameters will also pass through X, the midpoint of BD.

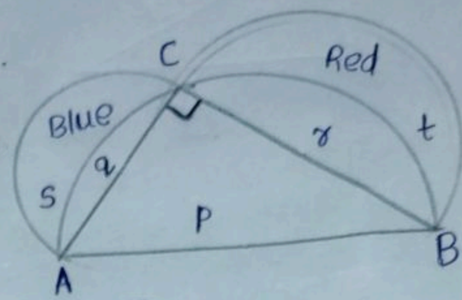
ii) ΔABD is an isosceles triangle. So circles drawn with the sides AB and AD as diameter will pass through X, the midpoint of BD. In the same way in the isosceles triangle CBD. circles drawn with the sides CB and CD as diameter will pass through X.



∴ This is true for any quadrilaterals with adjacent sides equal.

9. Ans) Since angle in a semicircle is a right angle,

$\triangle ABC$ is a right angle.



Area of the semicircle with AB as diameter $= \frac{1}{2}\pi r^2$

$$= \frac{1}{2} \times \pi \times \left[\frac{AB}{2}\right]^2$$

$$= \frac{1}{2}\pi \times \frac{AB^2}{4} = \frac{1}{8}\pi AB^2 \longrightarrow (1)$$

Area of the semicircle with AC as diameter

$$= \frac{1}{2} \times \pi \times \left(\frac{AC}{2}\right)^2 = \frac{1}{8}\pi AC^2 \longrightarrow (2)$$

Area of the semicircle with BC as diameter

$$= \frac{1}{2} \times \pi \times \left(\frac{BC}{2}\right)^2 = \frac{1}{8}\pi BC^2 \longrightarrow (3)$$

$(2)+(3)$, $\frac{1}{8}\pi AC^2 + \frac{1}{8}\pi BC^2 = \frac{1}{8}\pi\left(AC^2 + BC^2\right)$

$= \frac{1}{8}\pi AB^2$ (Using Pythagoras theorem)

That means

Area of semicircle with AB as diameter

= Area of semicircle with AC as diameter +

Area of semicircle with BC as diameter

$\therefore p + q + r = q + s + r + t$

$p = q + s + r + t - q - r = s + t$

That is, area of the triangle =

area of the blue part +

area of the red part