SHIKSHA CLASSES

Sub. : Maths | **Answer Paper** | **Marks : 20**

Std. : VIIIth - S.B. | **15. Area**

Q.1 : A) Select the most appropriate Alternative. 02

1) If the radius of a circle is 21 cm, then the area of the circle is.

Ans : a) 1386 sq cm

2) 1 acre is nearly.

Ans : b) 0.4 hectare

: B) Solve the following. 01

1) Lengths of the diagonals of a rhombus are 15cm and 24 cm, find its area.

Ans : Lengths of the diagonals of a rhombus are 15 cm and 24 cm.

Area of rhombus = $\frac{1}{2} \times$ product of the lengths of diagonals

$= \frac{1}{2} \times 15 \times 24$

$= 15 \times 12$

$= 180$ sq cm

Area of the rhombus is 180 sq cm.

Q.2 : A) Solve any one of the following. (Activity) 02

1) Fill in the blanks : If radius of a circle is 21 cm then find its area.

Ans : Area of circle = πr^2

$= \frac{22}{7} \times \boxed{21^2}$

$= \frac{22}{7} \times \frac{\boxed{21}}{1} \times \frac{\boxed{21}}{1}$

$= 66 \times \boxed{21} = 1386$ sq cm.

2) Fill in the blanks : Lengths of the diagonals of a rhombus are 11.2 cm and 7.5 cm respectively. Find the area of rhombus.

Ans : Area of a rhombus

$= \frac{1}{2} \times \boxed{\text{product of the lengths of diagonals}}$

$= \frac{1}{2} \times \frac{11.2}{1} \times \frac{\boxed{7.5}}{1}$

$= 5.6 \times \boxed{7.5}$

$= \boxed{42}$ sq cm

: B) Solve any one of the following. 02

1) Find the area of the circle if its circumference is 88 cm.

Ans : Circumference of the circle = 88 cm

Circumference of the circle = $2\pi r$

$\therefore 88 = 2 \times \frac{22}{7} \times r$

$\therefore r = \frac{88 \times 7}{2 \times 22}$

$\therefore r = 14$cm

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

$= \frac{22}{7} \times 14 \times 14$

$= 616$ sq cm

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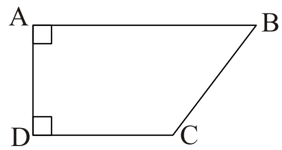
Area of the circle is 616 sq cm.

2) In □ABCD, l(AB) = 13 cm, l(DC) = 9 cm, l(AD) = 8 cm, find the area of □ABCD.



Ans : $l(\text{AB}) = 13$ cm, $l(\text{DC}) = 9$cm and $l(\text{AD}) = 8$cm.

□ABCD is a trapezium.

Area of a trapezium $= \frac{1}{2} \times$ sum of the lengths of parallel sides $\times$ height

$\therefore A(\square ABCD) = \frac{1}{2} \times [l(AB) + l(DC)] \times l(AD)$

$\therefore A(\square ABCD) = \frac{1}{2} \times [13+9] \times 8$

$\therefore A(\square ABCD) = 22 \times 4$

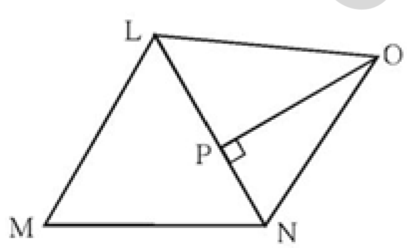
$\therefore A(\square ABCD) = 88$ sq cm

Area of □ABCD is 88 sq cm.

Q.3 : A) Solve any one of the following. (Activity) 03

1) The figure of a plot and its measures are given.

l(LM) = 60 m. l(MN) = 60 m. l(LN) = 96 m. l(OP) = 70 m.
find the area of the plot.



Ans : In the figure we get two triangles, ΔLMN and ΔLNO. We know the lengths of all sides of ΔLMN so by using Heron's formula we will find the area of this triangle.

In ΔLNO, side LN is the base and l(OP) is the height. We will find the area of ΔLNO.

Semiperimeter of ΔLMN,

$$s = \frac{60+60+96}{2} = \frac{216}{2} = 108 \text{ m}$$

$\therefore$ Area of ΔLMN

$$= \sqrt{108(108-60)(108-60)(108-96)}$$

$$= \sqrt{108 \times 48 \times \boxed{48} \times 12}$$

$$= \sqrt{12 \times 9 \times 48 \times \boxed{48} \times 12}$$

$A(\Delta LMN) = 12 \times 3 \times \boxed{48} = \boxed{1728}$ sq m

$A(\Delta LNO) = \frac{1}{2}$ base $\times$ height

$$= \frac{1}{2} \times 96 \times 70$$

$$= 96 \times \boxed{35} = 3360 \text{ sq m}$$

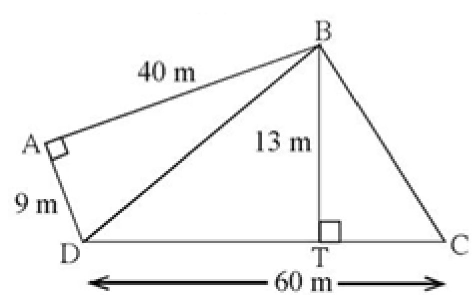
Area of □LMNO = A (ΔLMN) + A(ΔLNO)

$$= \boxed{1728} + 3360$$

$$= 5088 \text{ sq m}$$

$\therefore$ Area of the plot LMNO is 5088 sq m

2) Some measures are given in the adjacent figure, find the area of □ABCD.



Ans : $l(\text{BA}) = 40$ m, $l(\text{AD}) = 9$ m, $l(\text{DC}) = 60$ m and $l(\text{BT}) = 13$ m.

$A(\Delta BAD) = \frac{1}{2} \times l(BA) \times \boxed{l(AD)}$

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$= \frac{1}{2} \times 40 \times \boxed{9}$

$= \boxed{180}$ sq m.

$A(\Delta BDC) = \frac{1}{2} \times l(DC) \times l(BT)$

$= \frac{1}{2} \times 60 \times \boxed{13}$

$= \boxed{390}$ sq m.

$A(\square ABCD) = A(\Delta BAD) + \boxed{A(\Delta BDC)}$

$= 180 + 390$

$= 570$ sq m

$\therefore$ Area of $\square ABCD$ is 570 sq m.

: **B) Solve any one of the following.** 03

1) Sides of a triangle are 45 cm, 39 cm and 42 cm, find its area.

Ans : Sides of a triangle are 45 cm, 39 cm and 42 cm.

Here, a = 45 cm, b = 39 cm and c = 42 cm

Semiperimeter (s) $= \frac{a+b+c}{2}$

$= \frac{45+39+42}{2}$

$= 63$ cm

Area of a triangle

$= \sqrt{s(s-a)(s-b)(s-c)}$

$= \sqrt{63(63-45)(63-39)(63-42)}$

$= \sqrt{63 \times 18 \times 24 \times 21}$

$= \sqrt{9 \times 7 \times 9 \times 2 \times 8 \times 3 \times 7 \times 3}$

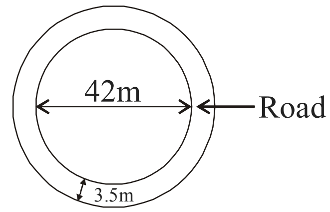
$= \sqrt{9^2 \times 7^2 \times 16 \times 3^2}$

$= \sqrt{9^2 \times 7^2 \times 4^2 \times 3^2}$

$= 9 \times 7 \times 4 \times 3 \qquad = 756$ sq cm

$\therefore$ Area of the triangle is 756 sq cm.

2) Diameter of the circular garden is 42 m. There is a 3.5 m wide road around the garden. Find the area of the road.



Ans : Diameter of the circular garden = 42 m

$\therefore$ its radius (r) $= \frac{42}{2} = 21$ m

Width of the road = 3.5 m

Radius of the outer circle (R)

= r + width

= 21 + 3.5

= 24.5 m

Area of the road = Area of the outer circle – Area of the inner circle

$= \pi R^2 - \pi r^2$

$= \pi [R^2 - r^2]$

$= \frac{22}{7} [24.5^2 - 21^2]$

$= \frac{22}{7} [600.25 - 441]$

$= \frac{22}{7} \times 159.25$

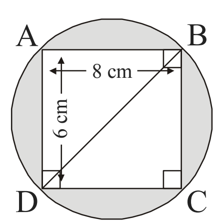
$= 22 \times 22.75$

$= 500.5$ sq m

$\therefore$ Area of the road is 500.5 sq m.

Q.4 : Solve any one of the following. 04

1) In figure. Find the area of the shaded region. [Use $\pi = 3.14$]



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Ans : Clearly, Diameter the circle = Diagonal BD of rectangle ABCD

$\therefore$ Diameter $= BD = \sqrt{BC^2 + CD^2}$

$= \sqrt{6^2 + 8^2}$ cm

$= \sqrt{100} = 10$ cm

Let r be the radius of the circle, then,

$r = \frac{10}{2}$ cm = 5cm.

Area of rectangle ABCD = AB $\times$ BC

$= (8 \times 6)$ cm^2

$= 48$ cm^2

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

$= 3.14 \times (5)^2$ cm^2

$= 78.50$ cm^2

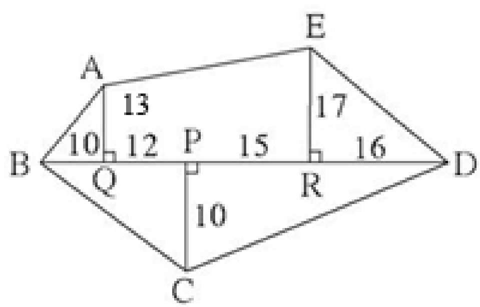
Hence,

Area of the shaded region = Area of the circle $-$ Area rectangle ABCD

$= (78.50 - 48)$ cm^2

$= 30.50$ cm^2.

2) Adjacent figure is a polygon ABCDE. All given measures are in metre. Find the area of the given figure.



Ans : Here ΔAQB, ΔERD are right angled triangles and $\square AQRE$ is a trapezium.

Base and height of ΔBCD is given. Now let us find the area of each figure.

$A(\Delta AQB) = \frac{1}{2}\, l(BQ) \times l(AQ)$

$= \frac{1}{2} \times 10 \times 13 = 65$ sq m

$A(\Delta ERD) = \frac{1}{2}\, l(RD) \times l(ER)$

$= \frac{1}{2} \times 16 \times 17 = 136$ sq m

$A(\square AQRE) = \frac{1}{2}\,[l(AQ) + l(ER)] \times l(QR)$

$= \frac{1}{2}\,[13+17] \times (12+15)$

$= \frac{1}{2} \times 30 \times 27$

$= 15 \times 27 = 405$ sq m

$l(BD) = l(BP) + l(PD)$

$= 10+12+15+16 = 53$ m

$A(\Delta BCD) = \frac{1}{2} \times l(BD) \times l(PC)$

$= \frac{1}{2} \times 53 \times 10 = 265$ sq m

$\therefore$ Area of polygon ABCDE

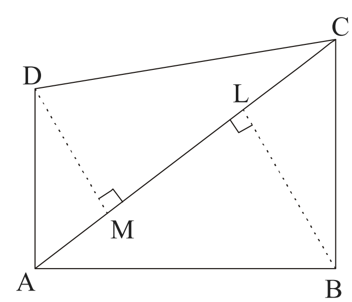
$= A(\Delta AQB) + A(\square AQRE) + A(\Delta ERD) + A(\Delta BCD)$

$= 65 + 405 + 136 + 265$

$= 871$ sq m

Q.5 : Solve any one of the following. 03

1) The diagonal of a quadrilateral is 20m in length and the perpendiculars to it from the opposite vertices are 8.5m and 11m. Find the area of the quadrilateral.



Ans : In quadrilateral ABCD, We have

AC = 20 m

Let BL $\perp$ AC and DM $\perp$ AC such that BL = 8.5 m and DM = 11 m.

$\therefore$ Area of quadrilateral ABCD.

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$= \frac{1}{2} \times AC \times (BL + DM)$

$= \frac{1}{2} \times 20 \times (8.5 + 11)\ m^2$

$= 10 \times 19.5\ m^2$

$= 195\ m^2$

2) Area of a rhombus is 96 sq cm. One of the diagonals is 12 cm find the length of its side.

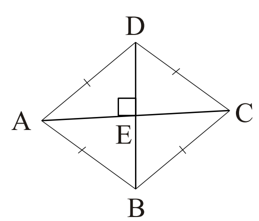
Ans : Let $\square ABCD$ be a rhombus.

Diagonal BD is of length 12 cm.

Area of the rhombus is 96 sq cm.

So first find the length of diagonal AC.

Area of a rhombus = $\frac{1}{2} \times$ product of lengths of diagonals



$\therefore 96 = \frac{1}{2} \times 12 \times l(AC) = 6 \times l(AC)$

$\therefore l(AC) = 16$ cm

Let E be the point of intersection of diagonals of a rhombus. Diagonals are perpendicular bisectors of each other.

$\therefore$ in ΔADE, m $\angle$ E = 90^0,

$l(DE) = \frac{1}{2} l(DB) = \frac{1}{2} \times 12 = 6;$

$l(AE) = \frac{1}{2} l(AC) = \frac{1}{2} \times 16 = 8$

Using Pythagoras theorem we get,

$l(AD)^2 = l(AE)^2 + l(DE)^2 = 8^2 + 6^2$

$= 64 + 36 = 100$

$\therefore l(AD) = 10$ cm

$\therefore$ side of the rhombus is 10 cm.

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