P.V.G.'s

Muktangan English School & Jr. College,

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Unit Test - I (2025-26)

Standard - X

Subject : Mathematics - (Part II) Marks - 20

Date : 11.08.2025 Time : 8.30 am to 9.30 am

Q1. A) Four alternative answers for each of the following subquestions are given. Choose the proper alternative answer and write its alphabet. **(2)**

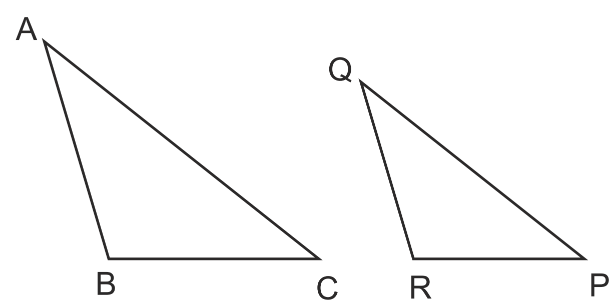
i) In ΔABC and ΔPQR if $\frac{AB}{QR} = \frac{BC}{PR} = \frac{CA}{PQ}$, then __________.

A) $\Delta CBA \sim \Delta PQR$

B) $\Delta PQR \sim \Delta CAB$

C) $\Delta PQR \sim \Delta ABC$

D) $\Delta BCA \sim \Delta PQR$



ii) Surface area of a sphere is ____________.

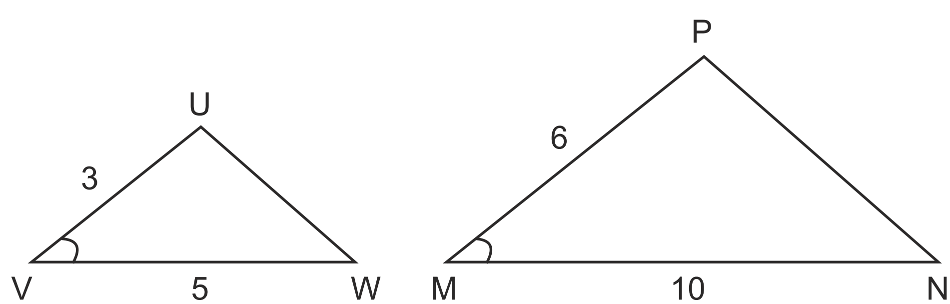
A) $2\ \pi r^2$ B) $4\ \pi r^2$

C) $\frac{4}{3}\pi r^3$ D) πr^2

B) Solve the following sub questions. **(2)**

i) Find the side of a square if its diagonal is $10\sqrt{2}$ cm.

ii) Observe the given triangles and state whether the triangles are similar. If yes, then by which test?



Q2 A) Complete the following activity. (Any 1) (2)

i) Area of a sector of a circle with radius 15 cm is 30 sq.cm. Find the length of the arc of the sector.

→ Solution : Area of sector = 30 sq.cm

radius (r) = 15 cm

We know,

Area of sector $= \dfrac{\ell \times \boxed{}}{2}$ .... (Formula)

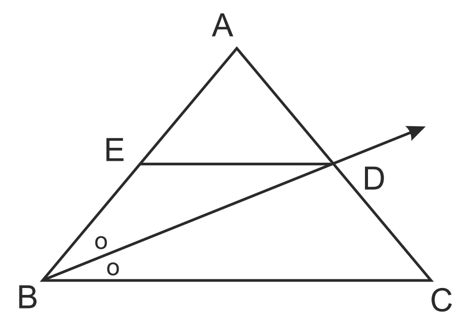
Substituting the values, we get

$\boxed{} = \dfrac{\boxed{} \times 15}{2}$

After solving, $\ell = \boxed{}$ cm

ii) In Δ ABC, ray BD bisects $\angle$ABC. Side DE || side BC then prove that

$\dfrac{AB}{BC} = \dfrac{AE}{EB}$



→ Proof - In Δ ABC, ray BD bisects $\angle$ABC,

$\therefore \dfrac{AB}{\boxed{}} = \dfrac{AD}{DC}$ ....(1) (angle bisector theorem)

In Δ ABC, DE || BC

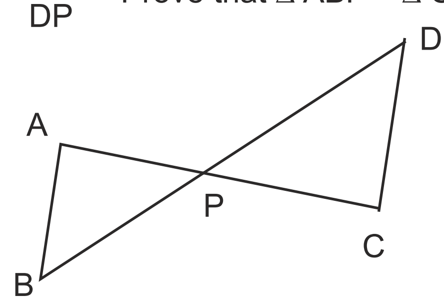
$\therefore \dfrac{AE}{\boxed{}} = \dfrac{\boxed{}}{DC}$ ....(2) (Reason : $\boxed{}$)

$\therefore$ from (1) and (2)

$\dfrac{AB}{BC} = \dfrac{AE}{EB}$ ....(Proved)

B) Solve the following. (Any 2) **(4)**

i) In the figure, Seg AC and seg BD intersect each other in point P and $\frac{AP}{CP} = \frac{BP}{DP}$ · Prove that Δ ABP ~ Δ CDP

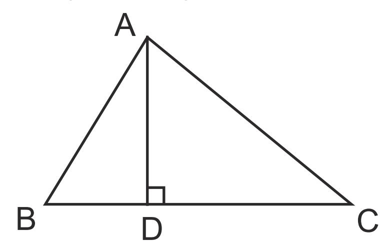


ii) A chord PQ of a circle with radius 15 cm subtends an angle of 60^0 with the centre of the circle. Find the area of minor sector ($\pi = 3.14$)

iii) In Δ ABC, seg AD $\perp$ seg BC,

$\angle$ C = 45^0, BD = 5 and AC = $8\sqrt{2}$

then find AD and BC.

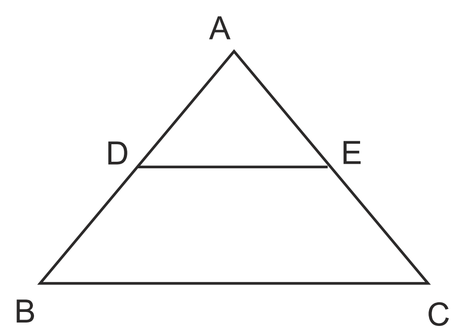


Q3. A) Complete the following activity. (Any 1) **(3)**

i) In the figure, ΔABC ~ ΔADE,

D is the midpoint of side AB.

Find $\frac{A(\Delta ABC)}{A(\Delta ADE)}$



→ Solution :

ΔABC ~ ΔADE .... (given)

$\frac{A(\Delta ABC)}{A(\Delta ADE)} = \frac{AB^2}{\boxed{}^2}$ ....(1) (Theorem of areas of similar triangles)

D is the $\boxed{}$ of side AB $\therefore$ AB = 2 $\boxed{}$

Substituting for AB in Equation (1), we get

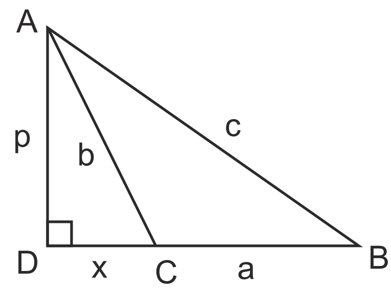
$\frac{A(\Delta ABC)}{A(\Delta ADE)} = \frac{(2AD)^2}{\boxed{}^2}$

$= \frac{\boxed{}}{\boxed{}}$ .... (after solving)

Hence, $\frac{A(\Delta ABC)}{A(\Delta ADE)} = \boxed{:}$

ii) In Δ ABC, $\angle$ ACB is an obtuse angle, seg AD $\perp$ seg BC, prove that

$AB^2 = BC^2 + AC^2 + 2BC \times CD$



$\rightarrow$ Solution :

In the figure, seg AD $\perp$ seg BC

Let AD = p, AC = b, AB = c, BC = a, DC = x and DB = a +x

In Δ ADB, by Pythagoras theorem,

$c^2 = \boxed{}^2 + p^2$

$c^2 = a^2 + 2ax + \boxed{}^2 + p^2$ .... (1)

Similarly, In Δ ADC

$b^2 = \boxed{}^2 + p^2$

$p^2 = b^2 - \boxed{}^2$ .... (2)

Substituting the value of p^2 from (2) in (1)

$c^2 = a^2 + 2ax + \boxed{}^2$ .... (after solving)

$\therefore \boxed{} = BC^2 + AC^2 + 2BC \times CD$

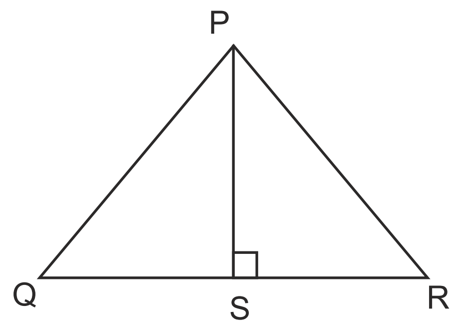
B) Solve the following questions. (Any 1) (3)

i) Prove : 'In a right angled triangle, the square of the hypotenuse is equal to the sum of the squares of remaining two sides'.

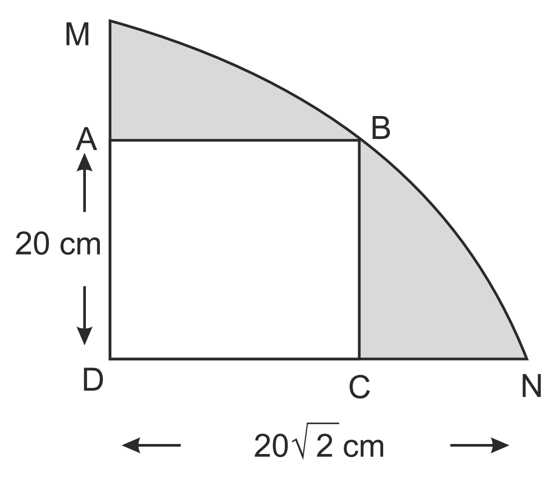
ii) Prove : 'When two traingles are similar, the ratio of areas of those triangles is equal to the ratio of the squares of their correspoding sides'

Q4. Solve the following questions. (Any 1) **(4)**

i) In an equilateral triangle ΔPQR, prove that $PS^2 = 3(QS)^2$



ii) In the given figure, a square ABCD of side 20 cm is inscribed in a sector D-MBN with its centre at D and radius $20\sqrt{2}$ cm. Find the area of the shaded region.



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