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Class: EM - CLASS 10 **Subject:** Mathematics - Part 2 (Geometry) **Time:**2 hrs
Date: 04-10-2025 **Paper:** Semester 1 **Marks:**40

Q1(A) Four alternative answer are given for every subquestion. Select the correct alternative and write the alphabet of that answer : **(4)**

(1) $\Delta ABC \sim \Delta XYZ$, $\frac{AB}{XY} = \frac{7}{4}$ then, = ...

a) △ ABC is bigger
b) Both triangles will be equal
c) △ XYZ is bigger
d) Cannot be decided

(2) Pick out false statement.
Statement 1 : Every pair of congruent triangles are similar.
Statement 2 : Every pair of similar triangles are congruent.

a) Statement 1
b) Both of above
c) Statement 2
d) None of above

(3) Find length of rectangle having breadth 8 units and diagonal 17 units.

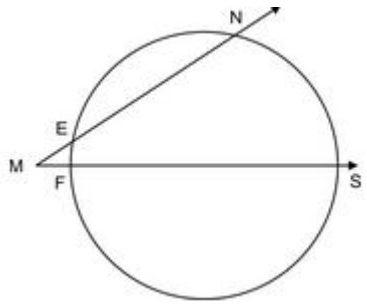
a) 15 units
b) 13 units
c) 16 units
d) 14 units

(4) In a cyclic □ ABCD, measure of ∠B is four times the measure of ∠D. Find the measure of ∠D.

a) 36°
b) 90°
c) 72°
d) 108°

(B) Solve the following subquestions : **(4)**

(1) In the adjoining figure, m(arc NS) = 125° , m(arc EF) = 37°, find the measure of ∠NMS.



(2) Identify, with reason, if the following is Pythagorean triplet 5, 12, 13.

(3) Construct a tangent to a circle using the centre of the circle.

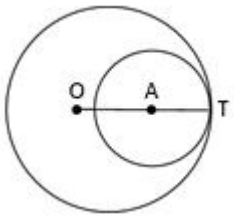
(4) Base of a triangle is 9 and height is 5. Base of another triangle is 10 and height is 6. Find the ratio of areas of these triangles.

Q2(A) Complete the following activities and rewrite it (any two) : **(4)**

(1) If Δ ABC ~ Δ PQR and AB : PQ = 2 : 3, then fill in the blanks.

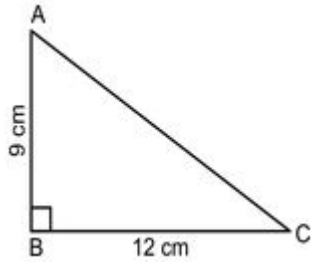
$\frac{A(\Delta ABC)}{A(\Delta PQR)}$ = ... = $\frac{(2)^2}{(3)^2}$ = ...

(2) Two circles having radii 3.5 cm and 4.8 cm touch each other internally. Find the distance between their centres.



Let two circles with centres O and A touch each other internally at point T
∴ O - A - T ... (If two circles are touching circles then the common point lies on the line joining their centres)
∴ OT = ... + AT ... (O - A - T)
∴ OA = ... (given)
OT = 4.8 cm, AT = 3.5 cm.
∴ OA = ...
OA = ... cm
∴ The distance between the centres is ..... cm.

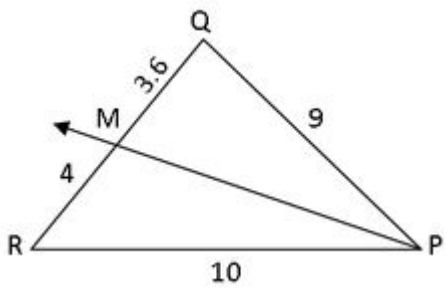
(3) Find the length of the hypotenuse of a right angled triangle if remaining sides are 9 cm and 12 cm.



△ ABC, ∠ABC = 90°
AB = 9 cm , BC = 12 cm
By Pythagoras Theorem,
..... = AC^2
..... = AC^2
81 + ... = AC^2
AC^2 = 225
AC = ...
The hypotenuse is .....

(B) Solve the following subquestions (any four) : **(8)**

(1) Given below is a triangle and lengths of its line segments. Identify in the figure if, ray PM is the bisector of ∠ QPR.

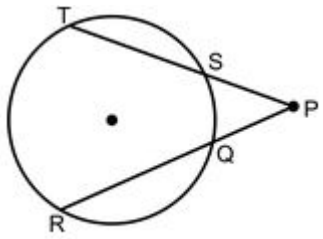


(2) Construct a tangent to a circle with centre P and radius 3.2 cm at any point M on it.

(3) What is the distance between two parallel tangents of a circle having radius 4.5 cm? Justify your answer.

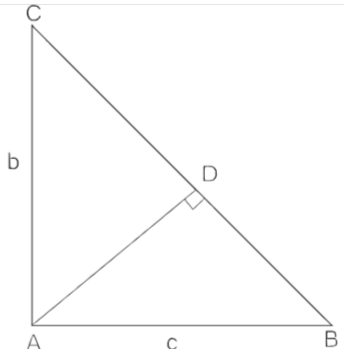
(4) Find the side and perimeter of a square whose diagonal is 10 cm.

(5) In figure if PQ = 6, QR = 10, PS = 8 find TS.



Q3(A) Complete the following activity and rewrite it (any one) : **(3)**

(1) In the given figure, find the length of AD in terms of b and c.



Given: ABC is a triangle, ∠A = 90°, AB = c, AC = b

To find: AD in terms of b and c

Solution:

Area of △ ABC = $\frac{1}{2}$AB × AC = _____ .....(i)

and △ ABC - $\frac{1}{2}$BC × AD ..... (ii)

But BC = _____

= _____

$\frac{1}{2}$BC × AD = $\frac{1}{2}$ bc ...(Form (i) and (ii))

= BC × AD = b.c

= _____ = bc ....(.....)

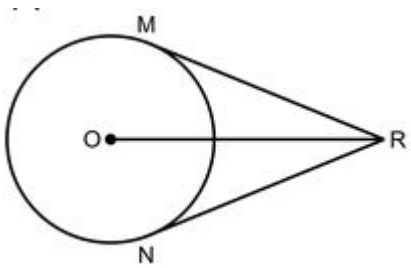
Hence AD = _____

(2) In the adjoining figure, O is the centre of the circle. From point R, seg RM and seg RN are tangent segments touching the circle at M and N. If OR = 10 cm and radius of the circle = 5 cm, then

(i) What is the length of each tangent segment ?

(ii) What is the measure of ∠MRO ?

(iii) What is the measure of ∠MRN ?

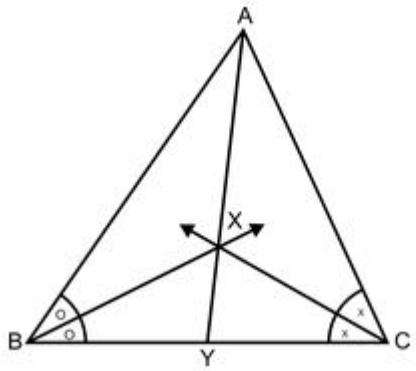


∠OMR = 90° ... (Radius perpendicular to tangent)

∴ In Δ OMR,
..... = OR^2 ... (Pythagoras theorem)
$52 + MR^2 = 10^2$
$MR^2 = 100 - 25$
$MR^2 = 75$
MR = ... (.....)
In Δ OMR,
OM = ...
∴ ∠ORM = ... (since opposite side is half of hypotenuse)
Similarly in Δ ONR we can show that,
∴ ∠MRN = ...
= 30° + 30°
= 60°

(B) Solve the following subquestions (any two) : **(6)**

(1)



In figure bisectors of ∠B and ∠C of △ ABC intersect each other in point X. Line AX intersects side BC in point Y. AB = 5, AC = 4, BC = 6 then find $\frac{AX}{XY}$.

(2) Prove that : A line perpendicular to a radius at its point on the circle is a tangent to the circle.

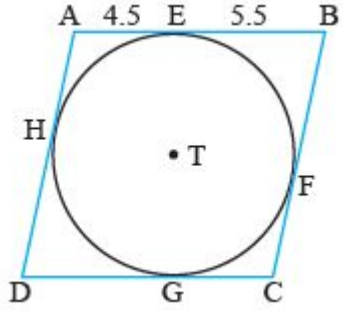
(3) Draw a circle with radius 3.4 cm. Draw a chord MN of length 5.7 cm in it. Construct tangents at point M and N to the circle.

(4) Find the diagonal of a rectangle whose length is 16 cm and area is 192 sq.cm.

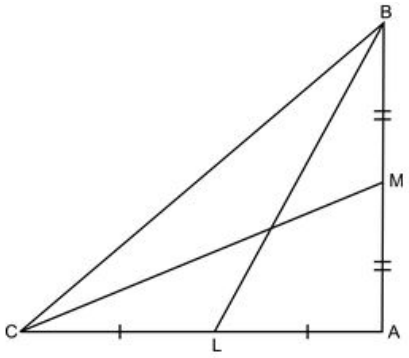
Q4) Solve the following subquestions (any two) : **(8)**

(1) ΔRST ~ Δ XYZ. In RST, RS = 4.5 cm, ∠RST = 40°, ST = 5.7 cm. Construct ΔRST and ΔXYZ, such that $\frac{RS}{XY} = \frac{3}{5}$.

(2) In □ ABCD is a parallelogram. It circumscribes the circle with centre T. Point E, F, G, H are touching points. If AE = 4.5, EB = 5.5, find AD.



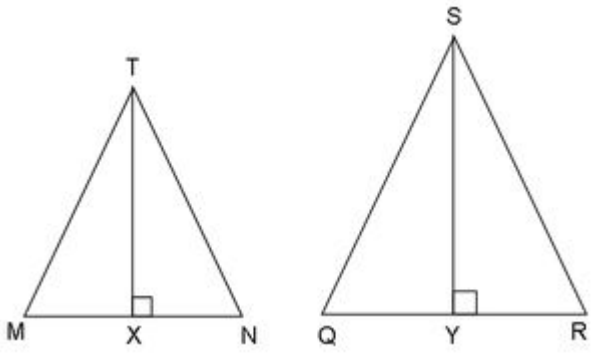
(3) In △ ABC, ∠BAC = 90°, seg BL and seg CM are medians of △ ABC. Then prove that: $4(BL^2 + CM^2) = 5BC^2$.



Q5) Solve the following subquestions (any one) : **(3)**

(1) ΔABC ~ ΔLMN. In ΔABC, AB = 5.5 cm, BC = 6 cm, CA = 4.5 cm. Construct ΔABC and ΔLMN such that $\frac{BC}{MN} = \frac{5}{4}$.

(2)



△ MNT ~ △ QRS. Length of altitude drawn from point T is 5 and length of altitude drawn from point S is 9. Find the ratio A (△ MNT) and A (△ QRS).

All the Best