4. Geometric Constructions

Question 1) (A) choose the correct alternative answer for each of the following sub question. Write the correct alphabet.

1) …… number of tangents can be drawn to a circle from the point on the circle.

A) 3 B) 2 C) 1 D) 0

2) The tangents drawn at the end of a diameter of a circle are…….

A) Perpendicular B) parallel C) congruent D) can't say

3) $\Delta LMN \sim \Delta HIJ$ and $\frac{LM}{HI} = \frac{2}{3}$ then

A) Δ LMN is a smaller triangle.

B) Δ HIJ is a smaller triangle.

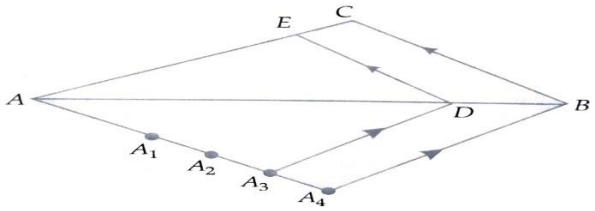
C) Both triangles are congruent.

D) Can't say.

4) ……number of tangents can be drawn to a circle from the point outside the circle.

A) 2 B) 1 C) one and only one D) 0

5)



In the figure Δ ABC ~Δ ADE then the ratio of their corresponding sides is --------.

A)$\frac{3}{1}$ B) $\frac{1}{3}$ C) $\frac{3}{4}$ D)$\frac{4}{3}$

6) Which theorem is used while constructing a tangent to the circle by using center of a circle?

A) tangent - radius theorem.

B) Converse of tangent - radius theorem.

C) Pythagoras theorem

D) Converse of Pythagoras theorem.

7) ΔPQR ~ ΔABC, $\frac{PR}{AC}$= $\frac{5}{7}$ then

A) ΔABC is greater.

B) Δ PQR is greater.

C) Both triangles are congruent.

D) Can't say.

8) $\Delta ABC \sim \Delta AQR$. $\frac{AB}{AQ} = \frac{7}{5}$ then which of the following option is true.

A) A-Q-B B) A-B-Q C) A-C-B D) A-R-B

Question 1 (B) solve the following examples (1 mark each)

1) Construct $\angle ABC = 60^0$ and bisect it.
2) Construct $\angle PQR = 115^0$ and divide it into two equal parts.
3) Draw Seg AB of lenght 9.7cm. Take point P on it such that AP = 3.5 cm and A-P-B. Construct perpendicular to seg AB from point P.
4) Draw seg AB of length 4.5 cm and draw its perpendicular bisector.
5) Draw seg AB of length 9 cm and divide it in the ratio 3:2.
6) Draw a circle of radius 3 cm and draw a tangent to the circle from point P on the circle.

Question 2) (A) Solve the following examples as per the instructions given in the activity. (2 marks each)

1) Draw a circle and take any point P on the circle. Draw ray OP

Draw perpendicular to ray OP from point P.

2) Draw a circle with center O and radius 3cm

Take any point P on the circle.

Draw ray OP.

Draw perpendicular to ray OP from point P

1) To draw tangents to the circle from the end points of the diameter of the circle.

Construct a circle with center O. Draw any diameter AB of it.

Draw ray OA and OB

Construct perpendicular to ray OA from point A

Construct perpendicular to Ray OB from point B

Question 2) (B) Solve the following examples (2 marks each)

1) Draw a circle of radius 3.4 cm take any point P on it. Draw tangent to the circle from point P.
2) Draw a circle of radius 4.2 cm take any point M on it. Draw tangent to the circle from point M.
3) Draw a circle of radius 3 cm. Take any point K on it. Draw a tangent to the circle from point K without using center of the circle.
4) Draw a circle of radius 3.4 cm. Draw a chord MN 5.7 cm long in a circle. Draw a tangent to the circle from point M and point N.
5) Draw a circle of 4.2 cm. Draw a tangent to the point P on the circle without using the center of the circle.
6) Draw a circle with a diameter AB of length 6 cm. Draw a tangent to the circle from the endpoints of the diameter.
7) Draw seg AB = 6.8 cm. Draw a circle with diameter AB. Draw points C on the circle apart from A and B. Draw line AC and line CB Write the measure of angle ACB .

Question 3) (A) Do the activity as per the given instructions. (3 marks each)

1) **Complete the following activity to draw tangents to the circle.**

a) Draw a circle with radius 3.3 cm and center O. Draw chord PQ of length 6.6cm.. Draw ray OP and ray OQ.

b) Draw a line perpendicular to the ray OP from P.

c) Draw a line perpendicular to the ray OQ from Q.

2) **Draw a circle with center O. Draw an arc AB of 100^0 measure. Perform the following steps to draw tangents to the circle from point A and B.**

   a) Draw a circle with any radius and center P.

   b) Take any point A on the circle.

   c) Draw ray PB such $\angle \mathrm{APB} = 100^0$.

   d) Draw perpendicular to ray PA from point A.

   e) Draw perpendicular to ray PB from point B.

3) **Do the following activity to draw tangents to the circle without using center of the circle.**

   a) Draw a circle with radius 3.5 cm and take any point C on it.

   b) Draw chord CB and an inscribed angle CAB

   c) With the center A and any convenient radius draw an arc intersecting the sides of angle BAC in points M and N.

   d) Using the same radius draw and center C, draw an arc intersecting the chord CB at point R.

   e) Taking the radius equal to d(MN) and center R, draw an arc intersecting the arc drawn in the previous step. Let D be the point of intersection of these arcs. Draw line CD. Line CD is the required tangent to the circle.

Question 3 B) Solve the following examples (3 marks each):

1) △ ABC ~ △ PBQ, In △ ABC, AB = 3 cm, ∠ B = $90^{0,}$ BC = 4 cm. Ratio of the corresponding sides of two triangles is 7:4. Then construct △ ABC and △ PBQ

2) ΔRHP ~ΔNED,In ΔNED,NE=7 cm ,∠D=30^{0}, ∠N=20^{0} and $\frac{HP}{ED}=\frac{4}{5}$. Then construct ΔRHP and ΔNED.

3) ΔPQR~ΔABC, In ΔPQR PQ=3.6cm, QR=4 cm, PR=4.2 cm ratio of the corresponding sides of triangle is 3:4 then construct ΔPQR and ΔABC.

4) Construct an equilateral △ ABC with side 5cm. △ ABC ~ △ LMN, ratio the corresponding sides of triangle is 6:7 then construct ΔLMN and ΔABC

5) Draw a circle with center O and radius 3.4. Draw a chord MN of length 5.7 cm in a circle. Draw a tangent to the circle from point M and N.

6) Draw a circle with center O and radius 3.6 cm. draw a tangent to the circle from point B at a distance of 7.2 cm from the center of the circle.

7) Draw a circle with center C and radius 3.2 cm. Draw a tangent to the circle from point P at a distance of 7.5 cm from the center of the circle.

8) Draw a circle with a radius of 3.5 cm. Take the point K anywhere on the circle. Draw a tangent to the circle from K (without using the center of the circle).

9) Draw a circle of radius 4.2 cm. Draw arc PQ measuring 120^0 Draw a tangent to the circle from point P and point Q.

10) Draw a circle of radius 4.2 cm. Draw a tangent to the circle from a point 7 cm away from the center of the circle.

11) Draw a circle of radius 3 cm and draw chord XY 5 cm long. Draw the tangent of the circle passing through point X and point Y (without using the center of the circle).

Question 4) solve the following examples. (4 marks each)

1) ΔAMT ~ΔAHE, In ΔAMT, AM =6.3 cm

∠MAT= 120^0, AT = 4.9 cm, $\frac{\mathrm{AM}}{\mathrm{HA}}=\frac{7}{5}$ then construct ΔAMT and ΔAHE .

2) ΔRHP~ΔNED, In ΔNED, NE=7 cm. ∠D=30^0, ∠N=20^0, $\frac{HP}{ED}=\frac{4}{5}$ then construct ΔRHP and △NED .

3) ΔABC. ~ΔPBR, BC=8 cm, AC=10 cm , ∠B=90^0,

$\frac{BC}{BR}=\frac{5}{4}$ then construct △ABC and ΔPBR

4) ΔAMT. ~ΔAHE, In ΔAMT AM=6.3 cm, ∠TAM=50^0 ,AT=5.6cm, $\frac{AM}{AH}=\frac{7}{5}$, then construct △AMT and ΔAHE.

5) Draw a circle with radius 3.3cm. Draw a chord PQ of length 6.6cm . Draw tangents to the circle at points P and Q. Write your observation about the tangents.

6) Draw a circle with center O and radius 3 cm. Take the point P and the point Q at a distance of 7 cm from the center of the circle on the opposite side of the circle at the intersection passing through the center of the circle Draw a tangent to the circle from the point P and the point Q.

Question 5) Solve the following examples (3 marks each)

1) Draw a circle with radius 4cm and construct two tangents to a circle such that when those two tangents intersect each other outside the circle they make an angle of 60^0 with each other.
2) AB = 6 cm, ∠BAQ = 50^0. Draw a circle passing through A and B so that AQ is the tangent to the circle.

3) Draw a circle with radius 3 cm. Construct a square such that each of its side will touch the circle from outside.

4) Take points P and Q on the same side of line AB Draw a circle passing through point P and point Q so that it touches line AB.

5) Draw any circle with radius greater than 1.8 cm and less than 3 cm. Draw a chord AB 3.6 cm long in this circle. Tangent to the circle passing through A and B without using the center of the circle

6) Draw a circle with center O and radius 3 cm. Take point P outside the circle such that d (O, P) = 4.5 cm. Draw tangents to the circle from point P.

7) Draw a circle with center O and radius 2.8 cm. Take point P in the exterior of a circle such that tangents PA and PB drawn from point P make an angle $\angle APB$ of measure 70^0.

8) Point P is at a distance of 6 cm from line AB. Draw a circle of radius 4cm passing through point P so that line AB is the tangent to the circle.

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