1. Solve any six sub-questions:

(i) A circle of radius 6 cm has two tangents AB and CD parallel to each other. What is the distance between these tangents?

(ii) In the given figure,

\[ m(\text{arc PMQ}) = 120^\circ \]

Find \( m(\angle PQS) \) and \( m(\angle PQR) \).

(iii) \( \triangle ABC \sim \triangle PQR \), then

(a) State which ratios of sides are equal to \( \frac{AB}{PQ} \).
(b) State which angles are congruent to \( \angle B \) and \( \angle R \) respectively.

(iv) Find the distance between the points A (0, 0) and B (-5, 12).

(v) In the given figure,

\( m(\angle MNP) = 90^\circ \),

\( \text{segment } NQ \perp \text{segment } MP \),

\( MQ = 4, PQ = 18 \).

Find NQ.

(vi) Draw a tangent to a circle of radius 3.5 cm at a point P on it. (Do not write the steps of construction.)

(vii) If \( \cos A = \frac{3}{5} \), then find the value of \( \sin A \).

(viii) The length, breadth and height of a cuboid are 20 cm, 18 cm and 10 cm respectively. Find its volume.

2. Solve any four sub-questions:

(i) In \( \triangle ABC \), \( AB^2 + AC^2 = 122 \), \( BC = 10 \). Find the length of the median on side BC.

(ii) In the given figure, the angle between two radii of a circle is 120°. Tangents to the circle are drawn at the outer ends of these radii. Find the measure of the angle between the tangents.

(iii) In the given figure,

\( \square ABCD \) is cyclic.

Prove that:

\( m(\angle ABC) + m(\angle ADC) = 180^\circ \)

(iv) Draw the circumcircle of \( \triangle ABC \), such that \( m(\angle B) = 90^\circ \),

\( BC = 5.4 \text{ cm}, AB = 6 \text{ cm} \). (Do not write the steps of construction.)

Evaluate: \( \csc^{2} 67^\circ - \tan^{2} 23^\circ \)

(vi) The volume of a cube is 512 cm³. Find the total surface area of the cube.

3. Solve any four sub-questions:

(i) The sides of the smaller triangle out of two similar triangles are 4, 5 and 6. If the perimeter of a larger triangle is 90, then what are the lengths of the sides of the larger triangle?

(ii) In the given figure,

\( \triangle DEF \) is an equilateral triangle.

\( \text{segment } DP \perp \text{segment } EF \) and \( E - P - F \).

Prove that: \( DP^2 = 3EP^2 \).
(iii) In the given figure, 
\[ A \] is the centre of the circle, 
\[ AN = 10 \text{ cm}. \] Line NM is tangent at M. 
Determine the radius of 
the circle, if \( MN = 5 \text{ cm}. \)

(iv) In the given figure, point M in the interior of the circle, is a point 
of intersection of two chords AB and CD of the same circle. Show 
that:
\[ CM \times BD = BM \times AC. \]

(v) Show that:
\[ (\sec \theta + \tan \theta)(1 - \sin \theta) = \cos \theta. \]

(vi) If \( A = (6, 8), \) \( B = (3, 2) \) and P divides seg AB internally in the ratio 4 : 3, find the 
coordinates of P.

4. Solve any three sub-questions:
(i) Prove: In a right-angled triangle, the square of the hypotenuse is equal to the sum of 
the squares of the remaining two sides.

(ii) Construct \( \triangle ABC \) such that \( BC = 8 \text{ cm}, m\angle BAC = 40^\circ \) and altitude 
\( AD \) is of length 3 cm. (Do not write the steps of construction.)

(iii) In the given figure, a circle touches side BC of the \( \triangle ABC \) 
from outside of the triangle at point P. Further extended 
lines AC and AB are tangents to the circle at N and M 
respectively. Prove that:
\[ AM = \frac{1}{2}(\text{Perimeter of } \triangle ABC). \]

(iv) In the given figure, 
line AP is a tangent to the circle at A, 
secant through P intersects chord \( AB \) 
in a point X such that \( AP = PX = XY. \)
If \( PQ = 1 \) and \( OZ = 8, \) find \( AX. \)

(v) A road roller of diameter 0.9 m and length 1.8 m is used to press the ground. Find the 
area of the ground pressed by it in 500 revolutions. (Given: \( \pi = 3.14) \)

(vi) If the area of two similar triangles are equal, then prove that they are congruent.

5. Solve any three sub-questions:
(i) Prove: If a line parallel to a side of a triangle intersects other two sides in two distinct 
points then the other sides are divided in the same ratio by it.

(ii) G \((x, y)\) is the centroid of \( \triangle ABC, \) where \( A = (-1, -7), B = (3, 5) \) and \( C = (-14, -19). \) Find 
the coordinates of G. Also find the distance between the points B and G.

(iii) A tree breaks due to storm and the broken part bends so that the top of the tree 
touches the ground making an angle of 60° with the ground. The distance from the 
foot of the tree to the point where the top touches the ground is 20 metres. Find the 
height of the tree.

(iv) A cylindrical ice-cream pot of radius 20 cm and height 60 cm is filled completely with 
ice-cream. It was packaged in ready to sell cones of radius 2 cm and height 10 cm. 
How many such cones can be filled?

(v) In the given figure, points B and C 
lie on tangent to the circle drawn at point A. 
Chord \( AD \equiv \) Chord ED.
\[ \text{If } m(\text{arc EF}) = \frac{1}{2}m(\text{arc AD}) \text{ and } m(\text{arc DE}) = 84^\circ, \]
then determine
\[ (a) \ m\angle DAC \ (b) \ m\angle FDA \ (c) \ m\angle FED \ (d) \ m\angle BAF. \]

(vi) Draw a circle with centre M and radius 2.7 cm. Take a point \( P \) such that length of seg 
PM is 7.5 cm. Draw tangents to the circle through P. Draw a circle that touches the 
circle and the tangents. 
(Do not write the steps of construction.)