MODEL QUESTION PAPER 2027

MATHEMATICS (PART II) — GEOMETRY

Std. X (S.S.C.) · Maharashtra State Board

Time: 2 Hours **Max. Marks: 40**

General instructions:

(1) All questions are compulsory.
(2) Use of a calculator is not allowed.
(3) The numbers to the right of the questions indicate full marks.
(4) For every MCQ [Q. 1(A)], only the first attempt will be evaluated.
(5) Draw proper figures wherever necessary.

Q. 1.

(A) Choose the correct alternative and write its alphabet: **4**

(i) Angle made by the line with the positive direction of X-axis is 30 degrees. Find slope of the line.

(ii) If the side of the cube is 5 cm, then the volume of that cube is ..... (A) 10 cm3 (B) 100 cm3 (C) 125 cm3 (D) 25 cm3

(iii) Out of the following which is a Pythagorean triplet? (a) (1, 5, 10) (b) (5, 12, 13) (c) (2, 3, 4) (d) (5, 5, 2)

(iv) Two circles having radii 4 cm and 5 cm touch each other internally. Then the distance between the centres is ..... (A) 4 cm (B) 5 cm (C) 1 cm (D) 9 cm

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

(i) The ratio of corresponding sides of similar triangles is 3 : 5, then find the ratio of their areas.

(ii) Radius of a sector of a circle is 35 cm and length of its arc is 22 cm. What is the area of the sector? (a) 285 cm2 (b) 185 cm2 (c) 385 cm2 (d) 85 cm2

(iii) Find the slope of the line passing through the points A(2, 3) and B(4, 7).

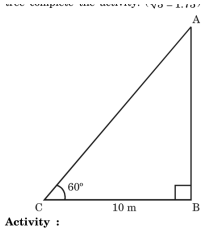
(iv) Find the diagonal of a square whose side is 5 cm.

Q. 2.

(A) Complete and write any TWO of the following activities: **4**

(i) If P is the midpoint of segment joining the points A(-4, 2) and B(6, 2), then complete the activity to find the co-ordinates of point P. Activity: (x1, y1) = (-4, 2), (x2, y2) = (6, 2); by midpoint formula x = (x1 + x2)/2 = 2/2 = 1, y = (y1 + y2)/2 = 4/2 = 2; co-ordinates of midpoint are (1, 2).

(ii) An observer at a distance of 10 m from a tree looks at the top of the tree, the angle of elevation is 60 degrees. To find the height of the tree complete the activity. (root 3 = 1.73) Activity: AB = h = height of tree, BC = 10 m; angle of elevation = angle BCA = 60 degrees; tan theta = AB/BC; tan 60 = AB/BC = root 3; AB = BC x root 3 = 10 root 3 = 10 x 1.73.

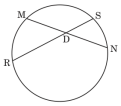


Activity :

(iii) Find surface area of a sphere of radius 7 cm.

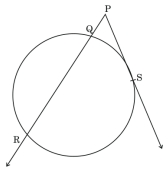
(B) Solve any FOUR of the following subquestions: **8**

(i) In the given figure, chord MN and chord RS intersect at point D. If RD = 15, DS = 4, MD = 8, find DN.



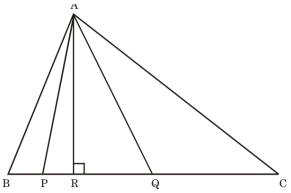
(ii) If sin theta = 20/29, then complete the activity to find cos theta. Activity: $\sin^2$ theta + $\cos^2$ theta = 1; $\cos^2$ theta = 1 - $\sin^2$ theta; $\cos^2$ theta = 1 - 400/841; $\cos^2$ theta = 441/841; taking square roots, cos theta = 21/29.

(iii) In the given figure, seg PS is a tangent segment, line PR is a secant. If PQ = 3.6, QR = 6.4, find PS. Activity: PS^2 = PQ x PR (Tangent secant segment theorem) = PQ x [PQ + QR] = 3.6 x [3.6 + 6.4] = 3.6 x 10; PS^2 = 36; PS = 6.



(iv) If sec theta = 25/7, find the value of tan theta. Solution: 1 + $\tan^2$ theta = $\sec^2$ theta; 1 + $\tan^2$ theta = $(25/7)^2$; $\tan^2$ theta = 625/49 - 49/49 = 576/49; tan theta = 24/7.

(v) In the given figure, AR perpendicular to BC, AR perpendicular to PQ, then complete the activity for finding A(triangle ABC)/A(triangle APQ). Activity: A(triangle ABC)/A(triangle APQ) = (BC x AR)/(PQ x AR); simplify to the ratio of bases.



Q. 3.

(A) Complete and write any ONE of the following activities: **3**

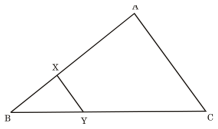
(i) triangle ABC ~ triangle ADE. In triangle ABC, AB = 6.3 cm, angle CAB = 50 degrees, AC = 5.6 cm and AB/AD = 7/5. Construct triangle ADE.

(ii) Draw a circle with centre O and radius 3.5 cm, take a point P at a distance 5.7 cm from the centre. Draw tangents to the circle from point P.

(B) Solve any TWO of the following subquestions: **6**

(i) Find the co-ordinates of point P, if P divides the line segment joining the points A(-1, 7) and B(4, -3) in the ratio 2 : 3.

(ii) In the given figure, seg XY parallel side AC. If 2AX = 3BX and XY = 9, complete the activity to find the value of AC. Activity: 2AX = 3BX; AX/BX = 3/2; (AX + BX)/BX = (3 + 2)/2; AB/BX = 5/2; triangle BCA ~ triangle BYX (AA test of similarity); BA/BX = AC/XY (corresponding sides); 5/2 = AC/9; AC = 22.5.



Activity :

(iii) Prove that, opposite angles of a cyclic quadrilateral are supplementary.

(iv) Prove that: The tangent segments drawn from an external point to the circle are congruent.

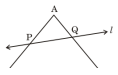
Q. 4.

Solve any TWO of the following subquestions: **8**

(i) Find the number of coins of 2.2 cm diameter and 0.2 cm thick, that can be made by melting a metallic right circular cylinder of height 0.2 m and diameter 8.8 cm.

(ii) In the given figure, line l intersects side AB and side AC of triangle ABC in points P and Q respectively. Show that A(triangle APQ)/A(triangle ABC) = (AP x AQ)/(AB x AC).

P and Q respectively. Show that $\frac{\vec{A(\Delta APQ)}}{\vec{A(\Delta ABC)}} = \frac{\vec{AP \times AQ}}{\vec{AB \times AC}}$.



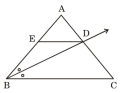
(iii) Draw a circle having radius 3 cm. Draw chord XY = 5 cm. Draw tangents to the circle at point X and Y without using centre.

Q. 5.

Solve any ONE of the following subquestions: **3**

(i) In the given figure, in triangle ABC ray BD bisects angle ABC, A - D - C, seg ED perpendicular to side BC, A - E - B, then to prove that AB/AE = BC/EB complete the activity. Activity: In triangle ABC, ray BD bisects angle B, AB/BC = AD/DC (I) (Angle bisector theorem); In triangle ABC, seg ED parallel side BC, AE/EB = AD/DC (II); from (I) and (II) AB/AE = BC/EB.

following activity.



(ii) AB is a chord of a circle with centre O. AC is a diameter of the circle. Line AT is a tangent at A. Write the answers: (a) Draw the figure using the given information. (b) Find the measure of angle CAT. (c) Find the measure of angle ABC.

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