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PRE-BOARD EXAMINATION (2025-2026)

CLASS X

SUBJECT : MATHEMATICS

BB

ne : 3 Hours M.M. : 80

neral Instructions:

This Question paper contains **five sections—A, B, C, D and E.**
Section A has **20 MCQs** of **1 mark** each.
Section B has **05 questions** of **2 marks** each.
Section C has **06 questions** of **3 marks** each.
Section D has **04 questions** of **5 marks** each.
Section E has **03 Case-based integrated units of assessment** with three **sub- parts** of **1, 1 and 2** marks each.
Each section is compulsory. However, there are internal choices in some questions. The **internal choice** has been provided in:

- 02 Questions of Section B
- 02 Questions of Section C
- 02 Questions of Section D
- 03 Questions of Section E

You have to attempt only one of the alternatives in all such questions.
Draw neat figures wherever required. Take $\pi = 22/7$ wherever required if not stated.

SECTION-A

s section consists of 20 questions of 1 mark each.

If the sum of the zeroes of a quadratic polynomial $kx^2 + 4x + 3k$ is equal to their product, then the value of (–k) is:

(a) –4/3 (b) 3/4 (c) 4/3 (d) –3/4

The zeroes of the quadratic polynomial $x^2 + 4\sqrt{3}x + 12$ are:

(a) both positive and repeated (b) both negative and repeated

(c) one positive and one negative (d) both negative and distinct

For what value of p do the pair of linear equations $-3x + 5y = 7$ & $2px - 3y = 1$ represent intersecting lines?

(a) all real values of p except 9/10 (b) all real values of p except –9/10

(c) all real values of p except 10/9 (d) all real values of p

If the point (x, y) is equidistant from the points (2, 1) and (1, –2), then:

(a) $x + 3y = 0$ (b) $3x + y = 0$ (c) $x + 2y = 0$ (d) $3x + 2y = 0$

Q5. Area of the triangle formed by the points (0, 0), (3, 0), and (0, –4) is:

(a) 6 (b) 12 (c) 3 (d) 24

Q6. The value of $(1 - \tan\theta + \sec\theta)(1 - \cot\theta + \operatorname{cosec}\theta)$ is:

(a) 1 (b) –1 (c) –2 (d) 2

Q7. A vertical pole of length 19 m casts a shadow 57 m long on the ground and at the same time a tower cast a shadow 51 m long . The height of the tower is :

(a) 171 m (b) 13 m (c) 17 m (d) 117 m

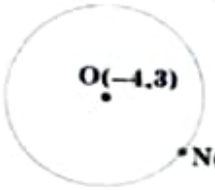
Q8. Tamanna goes to Dussehra mela where 6000 tickets are sold. If the probability of winning the first prize is 0.08, how many tickets has she bought?

(a) 40 (b) 240 (c) 480 (d) 680

Q9. In a family of 3 children, the probability of having at least one boy is:

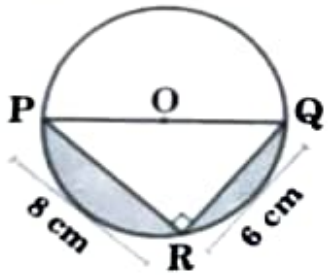
(a) 7/8 (b) 1/8 (c) 5/8 (d) 3/8

Q10. The coordinates of the centre O of a circle and a point N on the circle are O(–4, 3) and N(–2.4, 1.8). What is the radius of the circle?



(a) $\sqrt{0.4}$ units (b) 4 units (c) 2 units (d) $\sqrt{42.4}$ units

Q11. In the given figure, O is the centre of the circle. PR and RQ are chords of the circle. Radius = 5 cm, PR = 8 cm, QR = 6 cm and $\angle PRQ = 90°$. Find the area (in cm²) of the shaded region.



(a) $(25\pi/4 - 24)$ (b) $(25\pi/2 - 24)$

(c) $25\pi/4$ (d) $25\pi/2$

Q12. The volume of a right circular cone whose base area is 156 cm² and height 8 cm is:

(a) 2496 cm³ (b) 1248 cm³ (c) 1664 cm³ (d) 416 cm³

Q13. A solid metallic hemisphere of radius 7 cm is to be painted on its outer surface only. The area to be painted is:

(a) πr^2 (b) $2\pi r^2$ (c) $3\pi r^2$ (d) $4\pi r^2$

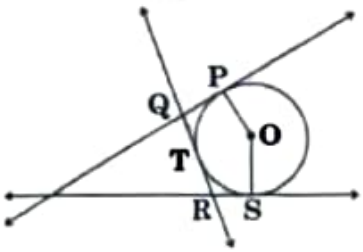
Q14. If the sum of the first n terms of an A.P. be $3n^2 + n$ and its common difference is 6, then its first term is :

(a) 2 (b) 3 (c) 1 (d) 4

Q15. Yash participated in a game. His probability of winning is 0.07. The probability of losing is:

(a) 0.03 (b) 0.93 (c) 0.3 (d) 0.33

Q16. In the given figure, tangents are drawn to a circle with centre O at P, T, and S. If QR = 12 cm and radius = 7 cm, what is the perimeter of PQTRSO?



(a) 26 cm (b) 31 cm (c) 38 cm (d) 45 cm

Q17. If $\alpha + \beta = 90°$ and $\alpha = 2\beta$, then $\cos^2\alpha + \sin^2\beta$ equals:

(a) 1 (b) 1/2 (c) 0 (d) 2

Q18. A number of the form 8^n (where $n > 1$) cannot be divisible by:

(a) 1 (b) 40 (c) 64 (d) 2^{2n}

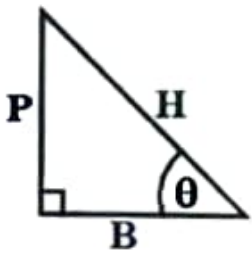
irections: Q19. & Q20 are Assersion-Reasoning based questions, a statement of Assertion (A) followed by a statement of Reason (R). Choose the correct answer out of the following choices.

) Both A and R are true and R is the correct explanation of A.

) Both A and R are true but R is not the correct explanation of A.

) A is true but R is false.

) A is false but R is true.



9. Assertion (A): $\sin^2\theta + \cos^2\theta = 1$, only when $\theta \neq 0°$.

Reason (R): In the adjacent diagram, $\tan\theta = \frac{P}{B}$.

0. Assertion (A): Area of the sector of a circle of radius 14 cm and central angle 90° is 154 cm^2.

Reason (R): Area of circle = $2\pi \times (\text{radius})^2$.

SECTION-B

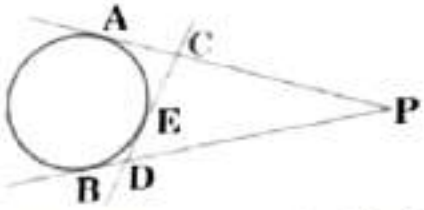
s section consists of 5 questions of 2 marks each.

. If $\sin\theta + \cos\theta = \sqrt{2}$, find $\sin\theta \cdot \cos\theta$.

OR

Find x: $2\text{cosec}^2 30° + x \sin^2 60° - (3/4)\tan^2 30° = 10$.

Q22. From an external point P, two tangents PA and PB are drawn to a circle. At a point E, a tangent is drawn to intersect PA and PB at C and D respectively. If PA = 15 cm, find the perimeter of ΔPCD.



Q23. X and Y are points on the sides PQ and PR respectively of ΔPQR. If PX = 4 cm, XQ = 4.5 cm, PY = 8 cm, and YR = 9 cm, show that XY || QR.

Q24. Find the greatest number that divides 230, 1314, and 1331 leaving remainder 5 in each case.

OR

Two numbers are in the ratio 2:3 and their LCM is 180. Write both the numbers. Also find their HCF.

Q25. Find the ratio in which the line segment joining A(1, –5) and B(–4, 5) is divided by the x-axis.

SECTION-C

This section consists of 6 questions of 3 marks each.

Q26. Prove that if a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, then the other two sides are divided in the same ratio.

Q27. Solve $p^2x^2 + (p^2 - q^2)x - q^2 = 0$ using the quadratic formula.

OR

If the roots of the quadratic equation $ax^2 + bx + c = 0$ are α and β, prove the following :

$$\frac{1}{\alpha^2} + \frac{1}{\beta^2} = \frac{b^2 - 2ac}{c^2}$$

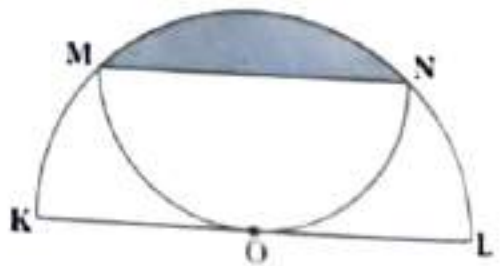
Q28. Prove that $\sqrt{3}$ is an irrational number.

Q29. A cone of maximum size is carved out from a cube of edge 14 cm. Find the surface area of the cone and of remaining solid left out after the cone is carved out.

Q30. The length of the hour hand of a clock is 10 cm. Find the area of the minor sector swept by the hour hand of the clock between 5 a.m. to 8 a.m. Also find the area of the major sector.

OR

A semicircle MON is inscribed in another semicircle. Radius OL of the larger semicircle is 6 cm. Find the area of the shaded segment in terms of π.



Q31. If the angle of elevation of a cloud from a point 10 m above a lake is 30° and the angle of depression of its reflection in the lake is 60°, find the height of the cloud from the surface of lake.

SECTION-D

This section consists of 4 questions of 5 marks each.

Q 32. The following frequency distribution gives monthly consumption of electricity of 68 consumers of a locality. Find the median , mean and mode of the data and compare them .

Monthly consumption (in units)	65-85	85-105	105-125	125-145	145-165	165-185	185-205
No. of consumption	*4*	*5*	*13*	*20*	*14*	*8*	*4*

Q 33. A train covered a certain distance at a uniform speed. If the train would have been 6 km/h faster, it would have taken 4 hours less than the scheduled time and if the train were slower by 6 km/h, it would have taken 6 hours more than the scheduled time. Find the length of the journey.

OR

An alloy of iron contains 42% iron and another 28% iron. How many kilograms of each should be used to make 140 kg of 35% iron alloy?

Q 34. Fermentation tanks are designed in the form of cylinder mounted on a cone . The total height of the tank is 3.3 m and height of conical part is 1.2 m. The diameter of the cylinderical as well as conical part is 1 m. Find the capacity of the tank. If the level of liquid in the tank is 0.7 m from the top, find the surface area of the tank in contact with liquid.

OR

A student was asked to make a model shaped like a cylinder with two cones attached to its ends by using a thin aluminium sheet . The diameter of the model is 3 cm and its total length is 12 cm. If each cone has a height of 2 cm, find the volume of air contained in the model.

Q 35. A ΔABC is drawn to circumscribe a circle of radius 4 cm such that the segment BD and DC are of lengths 10 cm and 8 cm respectively. Find the lengths of the sides AB and AC, if it is given that the area of $\Delta ABC = 90\ cm^2$

SECTION-E

This section consists of 3 case-study based questions of 4 marks each.

Each question has three sub-parts (i), (ii), and (iii). Two sub-parts are of 1 mark each while remaining third sub-part (with internal choice) is of 2 marks.

Q 36. CASE STUDY I :

An electrician Somnath has to repair an electric fault on the pole of height 5 m. He needs to reach a point 1.3 m below the top of the pole to undertake the repair work.

Based on the above information(Refer to the figure) , answer the following questions.

(i) What is the length of QS?

(ii) Find the length of ladder, when it is inclined at an angle of 60° to the horizontal.

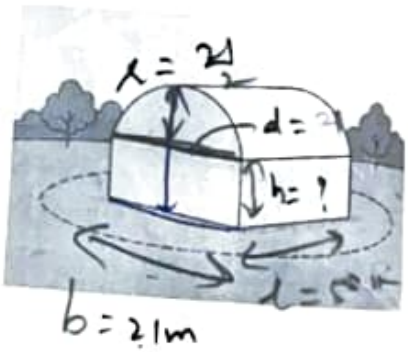
(iii) How far from the foot of the pole should he place the foot of the ladder?

OR

(iii) Suppose the length of ladder is 7.4 m and it is inclined at the horizontal angle of θ. Find θ. [Use $\sqrt{3} = 1.73$]

Q 37. CASE STUDY II :

A committee has decided to celebrate Durga Puja in a circular park of radius 35 m. The committee has given the contract to a tent house to set up the tent.



The architect has designed a canvas tent in the shape of a semi-cylindrical roof surmounting an open cuboidal shape as shown in the figure.

The dimensions of the rectangular base are 50 m × 21 m and the total height of the tent is 19 m.

Based on the above information answer the following questions.

(i) Find the height of the cuboidal part of the tent.

(ii) Find the area of the park outside the tent.

(iii) Find the total cost of canvas if it is purchased at the rate of ₹ 4 per square metre.

OR

(iii) Find the volume of air present in the tent.

38. CASE STUDY III :

Rohan was playing with cards and he created a structure with cards by stacking them on top of each other in the shape of pyramid. Each small triangle is made using 3 cards and each layer has 1 less triangle than the layer below it.

Based on the above information answer the following questions.

Rohan's younger brother Naman and his friends wanted to use 3 cards in the top layer and 18 in the bottom layer. Form an A.P., showing the number of cards in each layer starting from the top layer. Write the common difference of A.P.

Naman is planning to make another pyramid with the top and bottom layer containing 15 and 138 cards respectively. How many layers will such a pyramid have?

Suppose they have a total of 360 cards with them. Find the maximum number of layers that Naman can make using the cards they have, if they want to have 1 triangle i.e., 3 cards at the top layer.

OR

(iii) If the value of $t_n = 183$, then find the number of cards in the middle layer.