COMMON PRE-BOARD EXAMINATION

MATHEMATICS (STANDARD)–Code No. 041

CLASS-X-(2025-26)

SET: 1

Time allowed: 3 Hrs. **Maximum Marks: 80**

General Instructions:

Read the following instructions very carefully and follow them:

1. This Question Paper has 5 Sections A - E.
2. Section **A** has 20 Multiple Choice Questions (MCQs) carrying 1 mark each.
3. Section **B** has 5 questions carrying 02 marks each.
4. Section **C** has 6 questions carrying 03 marks each.
5. Section **D** has 4 questions carrying 05 marks each.
6. Section **E** has 3 Case Based integrated units of assessment (04 marks each) with sub-parts of the values of 1, 1 and 2 marks each respectively.
7. All Questions are compulsory. However, an internal choice in 2 Qs of 5 marks, 2 Qs of 3 marks and 2 Questions of 2 marks has been provided. An internal choice has been provided in the 2 marks questions of Section E.
8. Draw neat figures wherever required. Take $\pi = \frac{22}{7}$, wherever required if not stated.

(Section A)
Section A consists of 20 questions of 1 mark each

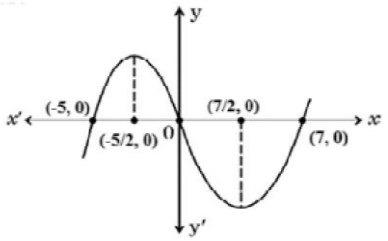
1. If $p^2 = \frac{32}{50}$, then p is a _____ number. 1
   (A) whole (B) integer (C) rational (D) irrational

2. HCF and LCM of two numbers x and y are 3 and 105. If $x + y = 36$, then the value of $\frac{1}{x} + \frac{1}{y}$ is 1
   (A) $\frac{1}{25}$ (B) $\frac{4}{35}$ (C) 35 (D) 315

3. The smallest irrational number by which $\sqrt{20}$ should be multiplied so as to get a rational number is 1
   (A) $\sqrt{20}$ (B) $\sqrt{2}$ (C) 5 (D) $\sqrt{5}$

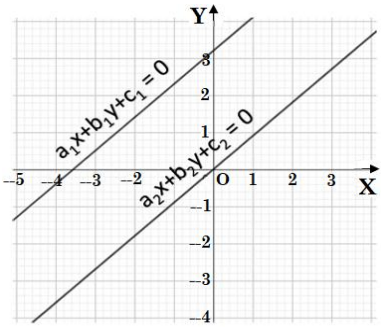
4. A letter is chosen at random from the letters of the word ASSASSINATION, then the probability that the letter chosen is a vowel is in the form $\frac{6}{2x+1}$, then x is equal to 1
   (A) 5 (B) 6 (C) 7 (D) 8

5. The graph of $y = p(x)$ is given for polynomial $p(x)$. The number of zeroes of $p(x)$ from the graph are 1



(A) 5 (B) 4
(C) 3 (D) 0

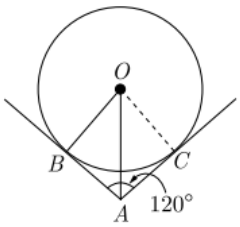
6. The lines representing the given pair of linear equations are non-intersecting. Which of the following statements is true? 1



(A) $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$ (B) $\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$
(C) $\frac{a_1}{a_2} \neq \frac{b_1}{b_2} = \frac{c_1}{c_2}$ (D) $\frac{a_1}{a_2} \neq \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$

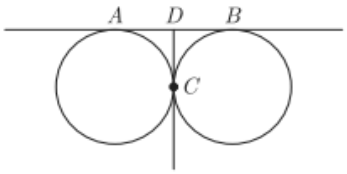
7. If $\Delta ABC \sim \Delta PQR$ with $\angle A = 32°$ and $\angle R = 65°$ then $\angle B$ is 1
(A) 32° (B) 65° (C) 83° (D) 97°

8. In the given figure, two tangents AB and AC are drawn to a circle with centre O such that $\angle BAC = 120°$, then OA is equal to 1



(A) 2AB (B) 3AB
(C) 4AB (D) 5AB

9. AB and CD are two common tangents to circles which touch each other externally at C. If D lies on AB such that CD = 4cm, then AB is equal to 1



(A) 4 cm (B) 6 cm
(C) 8 cm (D) 12 cm

10. What is the ratio in which the line segment joining (2, –3) and (5, 6) is divided by x-axis? 1
(A) 1 : 2 (B) 2 : 1 (C) 2 : 5 (D) 5 : 2

11. If the points A (6, 1), B (8, 2), C (9, 4) and D (p, 3) are the vertices of a parallelogram, taken in order, then the value of p is 1
(A) 4 (B) -6 (C) 7 (D) -2

12. If $\alpha + \beta = 90°$ and $\alpha = 2\beta$, then $cos^2\alpha + sin^2\beta$ is equal to 1
(A) 1 (B) $\frac{1}{2}$ (C) 0 (D) 2

13. If $sin\theta = \frac{a}{b}$, the $\cos\theta$ is equal to 1
(A) $\frac{b}{\sqrt{b^2-a^2}}$ (B) $\frac{b}{a}$ (C) $\frac{\sqrt{b^2-a^2}}{b}$ (D) $\frac{a}{\sqrt{b^2-a^2}}$

14. If $cosecA - cotA = \frac{4}{5}$, then $cosec\ A =$_____ 1
(A) $\frac{47}{40}$ (B) $\frac{59}{40}$ (C) $\frac{51}{40}$ (D) $\frac{41}{40}$

15. Two identical solid cubes of side k units are joined end to end. What is the surface area, in square units, of the resulting cuboid? 1

(A) k^2 (B) $2k^2$ (C) $10k^2$ (D) $12k^2$

16. The area of the sector of a circle with radius 6 cm and of sector angle 60° is 1

(A) $6\pi\ cm^2$ (B) $36\pi\ cm^2$ (C) $60\pi\ cm^2$ (D) $12\pi\ cm^2$

17. If the sum of the circumferences of two circles with radii R_1 and R_2 is equal to the circumference of a circle of radius R, then 1

(A) $R_1 + R_2 = R$ (B) $R_1 + R_2 \neq R$ (C) $R_1 + R_2 > R$ (D) $R_1 + R_2 < R$

18. Let the empirical relationship between the three measures of central tendency be a(Median) = Mode + b(Mean), then (2b + 3a) = 1

(A) 11 (B) 12 (C) 13 (D) 14

DIRECTIONS: In question numbers 19 and 20, a statement of **Assertion (A)** is followed by a statement of **Reason (R).**

Choose the correct option in each case:

(A) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).
(B) Both assertion (A) and reason (R) are true and reason (R) is not the correct explanation of assertion (A).
(C) Assertion (A) is true but reason (R) is false.
(D) Assertion (A) is false but reason (R) is true.

19. **Assertion:** $4x^2 - 12x + 9 = 0$ has repeated roots. 1
Reason: The quadratic equation $ax^2 + bx + c = 0$ have repeated roots if discriminant D > 0.

20. **Assertion:** Probability of any event cannot be more than 0 1
Reason: $P(E) + P(\bar{E}) = 1$

(Section – B)
Section B consists of 5 questions of 2 marks each

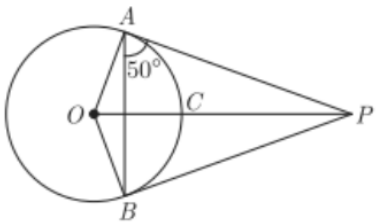
21. If the number x + 3, $2x$ +1 $and\ x$ −7 are in A.P., find the value of x. 2

(OR)

The seventeenth term of an AP exceeds its 10th term by 7. Find the common difference.

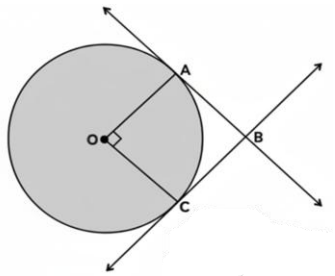
22. Two right triangles ABC and DBC are drawn on the same hypotenuse BC and on the same side of BC. If AC and BD intersect at P, prove that $AP \times PC = BP \times DP$. 2

23. From an external point P, tangents PA and PB are drawn to a circle with centre O. If $\angle PAB = 50°$, then find $\angle AOB$. 2



(OR)

Given a circle with centre O. Tangents are drawn at points A and C, such that they intersect at point B. If $OA \perp OC$, then show that quadrilateral OABC is a square.



24. Find the value of x: $2cosec^2 30° + xsin^2 60° - \frac{3}{4}tan^2 30° = 10.$ 2

25. Area of a sector of a circle of radius 36 cm is 54 π cm^2. Find the length of the corresponding arc of the sector. 2

(Section – C)
Section C consists of 6 questions of 3 marks each

26. Given that $\sqrt{3}$ is irrational, prove that $2 + 5\sqrt{3}$ is an irrational number. 3

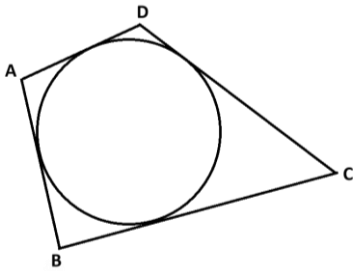
27. If the sum and product of the zeroes of the polynomial $ax^2 - 5x + c$ are equal to 10 each, find the value of 'a' and 'c'. 3

28. Two people are 16 km apart on a straight road. They start walking at the same time. If they walk towards each other with different speeds, they will meet in 2 hours. Had they walked in the same direction with the same speeds before, they would have met in 8 hours. Find their walking speeds. 3

(OR)

Find the value of k if the pair of equations $kx + (k-2)y = 1$ and $3x + y = 5$ has no solutions.

29. In the figure, a circle touches all the four sides of a quadrilateral ABCD.
If AB = 6 cm, BC = 9 cm and CD = 8 cm, then find the length of AD. 3



30. Prove that: $\sqrt{\frac{1+sinA}{1-sinA}} = secA + tanA$ 3

31. A box contains cards numbered 11 to 123. A card is drawn at random from the box. Find the probability that the number on the drawn card is 3
(i) a perfect square number
(ii) a multiple of 7

(OR)

One card is drawn from a well shuffled deck of 52 cards. Find the probability of getting:
(i) a non-face card
(ii) a black king
(iii) neither a red card nor a jack

(Section – D)
Section D consists of 4 questions of 5 marks each

32. A two-digit number is such that product of its digits is 12. If 36 is added to the number, the digits interchange their places. Find the number. 5

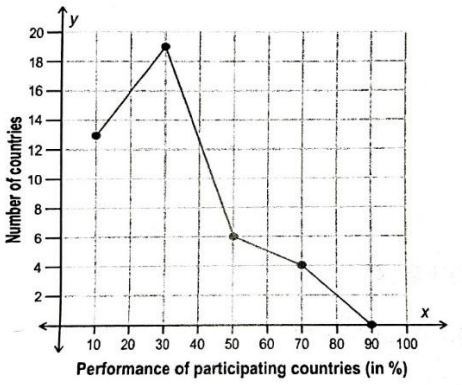
(OR)

Find the positive values of k for which the quadratic equations $x^2 + kx + 64 = 0$ and $x^2 - 8x + k = 0$ both will have the real roots.

33. State Basic Proportionality Theorem. 5
Using the above theorem prove that a line through the point of intersection of the diagonals and parallel to the base of a trapezium divides the non-parallel sides in the same ratio.

34. A vessel is a hollow cylinder fitted with a hemispherical bottom of the same base. The depth of the cylinder is $\frac{14}{3}m$ and the diameter of the hemisphere is $3.5m$. Calculate the volume and the internal surface area of the solid. 5

35. Shown is a frequency polygon. It represents the performance of all participating countries in a question in an international assessment.



If Japan's performance was 43%, did it perform better or worse than the average performance? Show your working.

(OR)

The median of the following data is 50.
Find the values of 'p' and 'q', if the sum of all frequencies is 90.

Marks Obtained	20-30	30-40	40-50	50-60	60-70	70-80	80-90
No. of Students	p	15	25	20	q	8	10

(Section – E)
Section E consists of 3 case study-based questions of 4 marks each

36. Treasure Hunt is an exciting and adventurous game where participants follow a series of clues/numbers/maps to discover hidden treasures. Players engage in a thrilling quest, solving puzzles and riddles to unveil the location of the coveted prize. While playing a treasure hunt game, some clues (numbers) are hidden in various spots collectively forming an A.P. If the number on the nth spot is $20 + 4n$, then answer the following questions to help the players in spotting the clues:

(i) Which number is on the first spot? 1

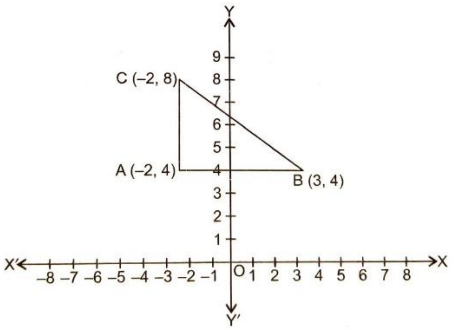
(ii) Which spot is numbered as 112? 2

(OR)

What is the sum of all numbers in the first 10 spots? 2

(iii) Which number is on the $(n - 2)^{th}$ spot? 1

37. Delhi Public School Society, which has so many schools in different cities of India. One of the branches of Delhi Public School is in Bokaro. In that School hundreds of students are in a classroom. Out of them, one of the girls is standing in the ground having coordinates (3, 4) facing towards west. She moves 5 units in straight line then takes right and moves 4 units and stops. Now, she is at her coaching centre. The representation of the above situation on the coordinate axes is given below.



(i) What is the shortest distance between her school and coaching centre? 1

(ii) Suppose point D (1, 4) divides the line segment AB in the ratio k:1, then find the value of k. 1

(iii) If we draw perpendicular lines from points A and B to the x-axis, then, find the area covered by these perpendicular lines, segment AB and x-axis. 2

(OR)

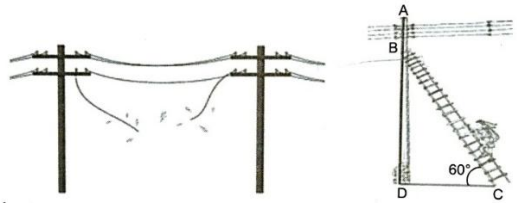
Find the image of the mid-point of AB with respect to x-axis. 2

38. A short circuit can happen on electric poles due to several reasons, like

(a) If the insulation is damaged or old, it may allow the hot wires to touch with neutral. This will cause a short circuit.

(b) If there are any loose wire connections or attachments, it will allow the live and neutral wires to touch.

An electrician has to repair an electric fault on a pole of height 5 m. He needs to reach a point 1 metre below the top of the pole to undertake the repair work



Based on the above information, answer the following questions:

(i) At what height has he kept the ladder?

(ii) What should be the length of the ladder that he should use which, when inclined at an angle of 60° to the horizontal, enables him to reach the required position 1 1

(iii) How far from the foot of the pole should he place the foot of the ladder? (Only for this sub part, use $\sqrt{3}$ as 1.732) 2

(OR)

What should be the length of the ladder if its foot is kept at a distance of 4 m from the foot of the pole and the same height as in part (i)? 2

End of the Question Paper