📚 MATH LOVE INSTITUTE

Education as a Service (EaaS)

MOST EXPECTED QUESTION PAPER - SET 1

SESSION: 2025-26

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Class	X	Subject	Mathematics Standard (041)
Time Allowed	3 Hours	Maximum Marks	80
Date	_____	Student Name	_____

GENERAL INSTRUCTIONS:

1. This question paper contains **38 questions**. All questions are compulsory.
2. This Question Paper is divided into **5 Sections - A, B, C, D and E**.
3. In **Section A**, Question numbers 1-18 are multiple choice questions (MCQs) and questions 19-20 are Assertion-Reason based questions of **1 mark each**.
4. In **Section B**, Question numbers 21-25 are very short answer (VSA) type questions, carrying **2 marks each**.
5. In **Section C**, Question numbers 26-31 are short answer (SA) type questions, carrying **3 marks each**.
6. In **Section D**, Question numbers 32-35 are long answer (LA) type questions, carrying **5 marks each**.
7. In **Section E**, Question numbers 36-38 are case study-based questions carrying **4 marks each** with sub parts of 1, 1 and 2 marks each respectively.
8. There is no overall choice. However, an internal choice in **2 questions of Section B, 2 questions of Section C and 2 questions of Section D** has been provided. Internal choice is provided in all 2 marks questions of Section E.
9. Draw neat and clean figures wherever required. Take $\pi = 22/7$ wherever required if not stated.
10. Use of calculators is **not allowed**.

SECTION A (20 × 1 = 20 Marks)

Q1. The LCM of two numbers is 1200. Which of the following **cannot** be their HCF? **[1]**

(a) 600
(b) 500
(c) 400
(d) 200

Q2. If α and β are the zeros of the polynomial $x^2 - 6x + k$, and $3\alpha + 2\beta = 20$, then the value of k is: **[1]**

(a) 16

(b) 32

(c) 8

(d) -16

Q3. The pair of equations $x + 2y = 5$ and $3x + 6y = 15$ has: **[1]**

(a) a unique solution

(b) no solution

(c) infinitely many solutions

(d) exactly two solutions

Q4. If the sum of first n terms of an AP is $3n^2 + 5n$, then its 20th term is: **[1]**

(a) 125

(b) 120

(c) 118

(d) 123

Q5. The value of k for which the quadratic equation $2x^2 + kx + 3 = 0$ has equal roots is: **[1]**

(a) $\pm 2\sqrt{6}$

(b) ± 6

(c) $\pm 4\sqrt{3}$

(d) $\pm 2\sqrt{3}$

Q6. In ΔABC, DE || BC where D and E are points on AB and AC respectively. If AD = 4 cm, DB = 6 cm and AE = 6 cm, then EC is: **[1]**

(a) 8 cm

(b) 9 cm

(c) 10 cm

(d) 12 cm

Q7. The distance between the points $(a \cos \theta + b \sin \theta, 0)$ and $(0, a \sin \theta - b \cos \theta)$ is: **[1]**

(a) $a^2 + b^2$
(b) $a^2 - b^2$
(c) $\sqrt{(a^2 + b^2)}$
(d) $\sqrt{(a^2 - b^2)}$

Q8. If $\sin \theta + \cos \theta = \sqrt{3}$, then $\tan \theta + \cot \theta$ is equal to: **[1]**

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

Q9. A tangent PQ at a point P of a circle of radius 5 cm meets a line through the centre O at a point Q such that OQ = 12 cm. Length PQ is: **[1]**

(a) 12 cm
(b) 13 cm
(c) $\sqrt{119}$ cm
(d) $\sqrt{69}$ cm

Q10. Two circles touch each other externally. The sum of their areas is 130π cm^2 and the distance between their centres is 14 cm. The radii of the circles are: **[1]**

(a) 3 cm and 11 cm
(b) 4 cm and 10 cm
(c) 5 cm and 9 cm
(d) 6 cm and 8 cm

Q11. If a cone is cut parallel to its base by a plane, the surface area of the frustum obtained is 150π cm^2. If the radii of the circular ends are 7 cm and 5 cm, then the slant height of the frustum is: **[1]**

(a) 10 cm
(b) 12 cm
(c) 5 cm
(d) 8 cm

Q12. A cylinder and a cone have equal radii of their bases and equal heights. The ratio of their volumes is: **[1]**

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

Q13. The median of the distribution given below is 14.4. The value of x + y is: **[1]**

Class	**0-6**	**6-12**	**12-18**	**18-24**	**24-30**
Frequency	4	x	12	y	8

Given: Total frequency = 40

(a) 16
(b) 18
(c) 20
(d) 24

Q14. If the mode of data 3, 4, 6, 7, 8, 9, 10, x is 7, then the value of x is: **[1]**

(a) 4
(b) 6
(c) 7
(d) 9

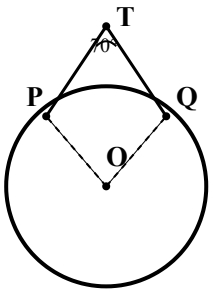
Q15. Two dice are thrown simultaneously. The probability of getting a sum of 7 is: **[1]**

(a) 1/6
(b) 1/9
(c) 5/36
(d) 7/36

Q16. A card is drawn from a well-shuffled deck of 52 cards. The probability that the card drawn is a face card is: **[1]**

(a) 3/13
(b) 4/13
(c) 3/26
(d) 1/13

Q17. In the given figure, two tangents TP and TQ are drawn from an external point T to a circle with centre O. If ∠PTQ = 70°, then ∠POQ is: **[1]**



(a) 90°
(b) 100°
(c) 110°
(d) 120°

Q18. The area of the largest triangle that can be inscribed in a semicircle of radius r is: **[1]**

(a) r^2
(b) $2r^2$
(c) $r^2/2$
(d) $r^2/4$

DIRECTION (Q19-Q20): In the following questions, a statement of Assertion (A) is followed by a statement of Reason (R). Choose the correct answer:

(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 but 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.

Q19. **Assertion (A):** $\sqrt{2} + \sqrt{3}$ is an irrational number. **[1]**

Reason (R): The sum of two irrational numbers is always irrational.

Q20. **Assertion (A):** The point (0, 4) lies on the y-axis. **[1]**

Reason (R): A point on the y-axis has its x-coordinate equal to zero.

SECTION B (5 × 2 = 10 Marks)

Q21. Find the zeroes of the quadratic polynomial $3x^2 - 2 - x$ and verify the relationship between the zeroes and the coefficients. **[2]**

Q22. Find the 11th term from the end of the AP: 10, 7, 4, ..., -62. **[2]**

OR

How many two-digit numbers are divisible by 3?

Q23. Prove that: $(\sin\theta + \text{cosec}\,\theta)^2 + (\cos\theta + \sec\theta)^2 = 7 + \tan^2\theta + \cot^2\theta$ **[2]**

Q24. A card is drawn at random from a well-shuffled pack of 52 cards. Find the probability that the card drawn is: **[2]**

(i) a king or a queen

(ii) a red card or an ace

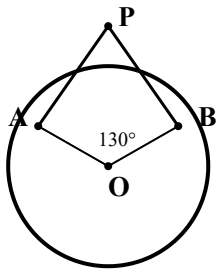
OR

Two dice are thrown simultaneously. Find the probability that:

(i) The sum of the numbers on the two dice is 8

(ii) Both dice show the same number

Q25. In the given figure, PA and PB are tangents from an external point P to a circle with centre O. If ∠AOB = 130°, find ∠APB. **[2]**



SECTION C (6 × 3 = 18 Marks)

Q26. Prove that √5 is an irrational number. Hence, prove that 2 + 3√5 is also an irrational number. **[3]**

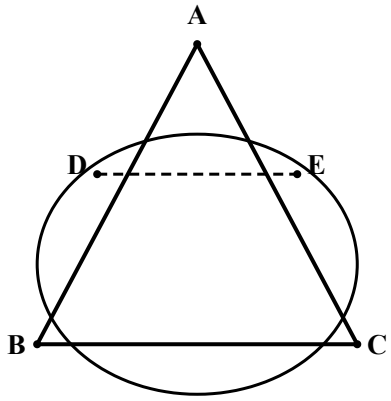
Q27. Solve for x: $1/(x-1) + 2/(x-2) = 3/(x-3)$, $x \neq 1, 2, 3$ **[3]**

OR

Find the values of k for which the quadratic equation $(k+4)x^2 + (k+1)x + 1 = 0$ has equal roots.

Q28. The sum of the 4th and 8th terms of an AP is 24 and the sum of the 6th and 10th terms is 44. Find the first three terms of the AP. **[3]**

Q29. In the given figure, ABC is a triangle in which AB = AC. A circle passing through B and C intersects the sides AB and AC at D and E respectively. Prove that DE || BC. **[3]**



Q30. Find the coordinates of the point which divides the line segment joining the points A(-1, 7) and B(4, -3) in the ratio 2:3. **[3]**

OR

Find the ratio in which the point P(x, 2) divides the line segment joining the points A(12, 5) and B(4, -3). Also find the value of x.

Q31. If the angle of elevation of a cloud from a point h metres above a lake is α and the angle of depression of its reflection in the lake is β, prove that the height of the cloud above the lake is $h(\tan\beta + \tan\alpha)/(\tan\beta - \tan\alpha)$. **[3]**

SECTION D (4 × 5 = 20 Marks)

Q32. A train travels 360 km at a uniform speed. If the speed had been 5 km/hr more, it would have taken 1 hour less for the same journey. Find the speed of the train. **[5]**

Q33. Prove that the lengths of tangents drawn from an external point to a circle are equal. Using this, prove that if quadrilateral ABCD is circumscribing a circle, then AB + CD = AD + BC. **[5]**

OR

Two circles touch each other externally at point C. AB is a common tangent to the circles touching them at A and B. Prove that ∠ACB = 90°.

Q34. A hemispherical bowl of internal radius 9 cm is full of liquid. The liquid is to be filled into cylindrical shaped small bottles each of diameter 3 cm and height 4 cm. How many bottles are necessary to empty the bowl? **[5]**

OR

A solid metallic sphere of diameter 21 cm is melted and recast into a number of smaller cones, each of diameter 3.5 cm and height 3 cm. Find the number of cones so formed.

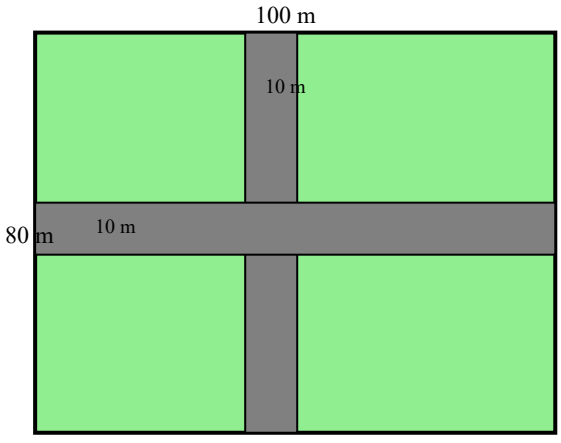
Q35. If the median of the following frequency distribution is 32.5, find the values of f_1 and f_2 where the total frequency is 40. **[5]**

Class Interval	**0-10**	**10-20**	**20-30**	**30-40**	**40-50**	**50-60**
Frequency	f_1	5	9	12	f_2	3

SECTION E (3 × 4 = 12 Marks)

Q36. CASE STUDY 1: GARDEN DESIGN

A rectangular garden of dimensions 100 m × 80 m has two roads, each 10 m wide, running in the middle of it, one parallel to the length and the other parallel to the breadth, as shown in the figure below:



Based on the above information, answer the following questions:

(i) Find the area of the roads. **[1]**

(ii) Find the area of the garden excluding the roads. **[1]**

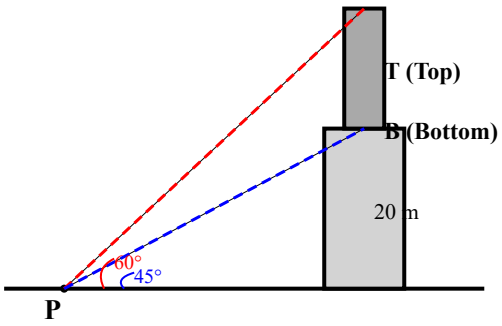
OR

If the cost of gravelling the roads is ₹10 per m^2, find the total cost of gravelling the roads.

(iii) If grass has to be laid in the remaining part of the garden at the rate of ₹15 per m^2, find the total cost. **[2]**

Q37. CASE STUDY 2: MOBILE TOWER

A mobile tower is located on the roof of a building. From a point on the ground, the angles of elevation of the top and bottom of the tower are 60° and 45° respectively. The height of the building is 20 m.



Based on the above information, answer the following questions:

(i) Find the distance of the point from the building. **[1]**

(ii) Find the height of the tower. **[1]**

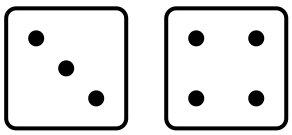
OR

Find the total height from the ground to the top of the tower.

(iii) Find the distance from point P to the top of the tower. **[2]**

Q38. CASE STUDY 3: DICE PROBABILITY

A game involves throwing two dice simultaneously. The player wins if the sum of the numbers on the dice is 5 or more. Otherwise, the player loses.



Based on the above information, answer the following questions:

(i) What is the total number of possible outcomes when two dice are thrown? **[1]**

(ii) Find the probability that the player loses the game. **[1]**

OR

Find the probability of getting a sum of 7 on the two dice.

(iii) Find the probability that the player wins the game. **[2]**

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Designed for Board Exam Preparation - Academic Session 2025-26