

MID - TERM EXAMINATION
CLASS - X
MATHEMATICS

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Xth I

1X12106-25

Max. Marks: 80

Time Allowed: 3 Hrs.

General Instructions:

- This question paper contains 38 questions.
- This Question Paper is divided into 5 Sections A, B, C, D and E.
- In Section A, Questions no. 1-18 are multiple choice questions (MCQs) and questions no. 19 and 20 are Assertion- Reason based questions of 1 mark each.
- In Section B, Questions no. 21-25 are very short answer (VSA) type questions, carrying 02 marks each.
- In Section C, Questions no. 26-31 are short answer (SA) type questions, carrying 03 marks each.
- In Section D, Questions no. 32-35 are long answer (LA) type questions, carrying 05 marks each.
- In Section E, Questions no. 36-38 are case study based questions carrying 4 marks each with sub parts of the values of 1, 1 and 2 marks each respectively.
- All Questions are compulsory. However, an internal choice in 2 Question of Section B, 2 Questions of Section C and 2 Questions of Section D has been provided. An internal choice has been provided in all the 2 marks questions of Section E.
- Draw neat and clean figures wherever required.
- Take $\pi = 22/7$ wherever required if not stated.
- Use of calculators is not allowed.

SECTION A

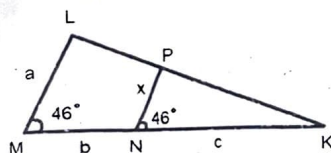
Q1. If two positive integers a and b are written as $a = x^3y^2$ and $b = xy^3$, where x and y are prime numbers, then HCF (a, b) is:

- (a) xy (b) xy^2 (c) x^3y^3 (d) None of these

Q2. Distance of point (3, -4) from origin is:

- (a) 5 (b) $\sqrt{5}$ (c) -5 (d) None of these

Q3. In the figure, $\angle M = \angle N = 46^\circ$ and a, b, c are lengths of LM, MN and NK respectively, then PN = ?



- (a) $ac/(b+c)$ (b) $ab/(b+c)$ (c) $ac/(b+c)$ (d) None of these

Q4. If the sum of the zeroes of the quadratic polynomial $ky^2 + 2y - 3k$ is equal to twice their product, the value of k:

- (a) $\frac{1}{3}$ (b) 3 (c) $\frac{2}{3}$ (d) None of these

Q5. If one of the zeroes of the quadratic polynomial $x^2 + 3x + k$ is 2, then the value of k is:

- (a) 10 (b) -10 (c) -7 (d) None of these

Q6. Graphically, the pair of linear equations $3x - y + 8 = 0$ and $3x - y = 24$ represent two lines which are:

- (a) Intersecting exactly at one point (b) Coincident lines
(c) Parallel lines (d) None of these

Q7. The pair of equations $y = 0$ and $y = -7$ has:

- (a) One solution (b) Two solutions (c) No solution (d) None of these

Q8. What is the common difference of an A.P. in which $a_{21} - a_7 = 84$?

- (a) 21 (b) 7 (c) 6 (d) None of these

Q9. If $p - 1$, $p + 3$, $3p - 1$ are in A.P., then p is equal to:

- (a) 2 (b) 3 (c) 4 (d) None of these

Q10. The line drawn from the eye of an observer to the point of in the object view by the observer is known as:

- (a) Vertical line (b) Horizontal line (c) Line of sight (d) None of these

Q11. Which trigonometric ratio is perpendicular divided by base?

- (a) $\tan$ (b) $\cot$ (c) $\sin$ (d) None of these

Q12. If $\tan x = \sin 45^\circ \cos 45^\circ + \sin 30^\circ$, then x equals:

- (a) 45° (b) 90° (c) 30° (d) None of these

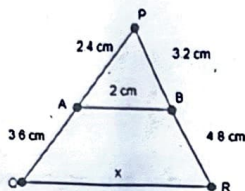
Q13. If $\triangle ABC$ and $\triangle DEF$ are similar such that $2AB = DE$ and $BC = 8$ cm, then EF is equal to:

- (a) 16 (b) 4 (c) 8 (d) None of these

Q14. Roots of the following equation are: $\sqrt{3}x^2 + 10x + 7\sqrt{3} = 0$

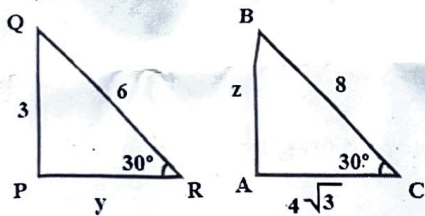
- (a) $-\frac{7}{\sqrt{3}}, \sqrt{3}$ (b) $-\frac{7}{\sqrt{3}}, -\sqrt{3}$ (c) $\frac{7}{\sqrt{3}}, -\sqrt{3}$ (d) None of these

Q15. In the given figure, value of x (in cm) is:-



- (a) 7 cm (b) 6 cm (c) 5 cm (d) None of these

Q16. If $\triangle ABC \sim \triangle PQR$, then $y + z$ equals:



- (a) $2 + \sqrt{3}$ (b) $4 + 3\sqrt{3}$ (c) $3 + 4\sqrt{3}$ (d) None of these

Q17. The product of HCF and LCM of two numbers is equal to:

- (a) Their sum (b) Product of the numbers (c) Their difference (d) None of these

Q18. The ratio of HCF to LCM of the least composite number and least prime number is:

- (a) 2 : 1 (b) 1 : 2 (c) 1 : 1 (d) None of these

Direction:

In the question number 19 and 20, a statement of Assertion (A) is followed by a statement of Reason (R). Choose the correct option.

- (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):** A quadratic polynomial having 5 and -3 as zeroes is $x^2 - 2x - 15$.

Reason (R): The quadratic polynomial having α and β as zeroes is given by

$$p(x) = x^2 - (\alpha + \beta)x + \alpha\beta$$

Assertion (A): The value of $\sin \theta = \frac{4}{3}$ is not possible.

Reason (R): Hypotenuse is the largest side in any right-angled triangle.

SECTION-B

Q21. If $\sec \theta + \tan \theta = m$ and $\sec \theta - \tan \theta = n$, find the value of $\sqrt{mn}$.

Q22. If two towers of heights h_1 and h_2 subtend angles of 60° and 30° , respectively, at the midpoint of the line joining their feet, then find the ratio $h_1 : h_2$.

Q23. For which values of p does the pair of equations have a unique solution?

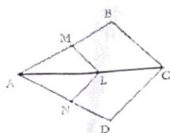
$$4x + py + 8 = 0$$

$$2x + 2y + 2 = 0$$

OR

Half the perimeter of a rectangular garden, whose length is 4 m more than its width, is 36 m. Find the dimensions of the garden.

Q24. In the given figure, if $LM \parallel CB$ and $LN \parallel CD$, prove that $\frac{AM}{AB} = \frac{AN}{AD}$.



Q25. If the distance between the points $(4, k)$ and $(1, 0)$ is 5, then what can be the possible values of k ?

OR

If the distances of $P(x, y)$ from $A(5, 1)$ and $B(-1, 5)$ are equal, then prove that $3x = 2y$.

SECTION-C

Q26. Rohan's mother is 26 years older than him. The product of their ages (in years), 3 years from now, will be 360. Find Rohan's present age.

OR

If the sum of the roots of the equation $4x^2 + bx + c = 0$ is equal to the product of their reciprocals, then find the value of bc .

Q27. The first term of an A.P. is 5, the last term 45 and the sum of all its terms is 400. Find the number of terms and the common difference of the A.P.

OR

The sum of the first 16 terms of an A.P. is 120. Find the second term of another A.P. whose first term is $\frac{2}{15}$ times the first term of the given A.P. and common difference same as the common difference of given A.P.

Q28. Prove the identity: $\frac{\tan \theta}{1 - \cot \theta} + \frac{\cot \theta}{1 - \tan \theta} = 1 + \sec \theta \operatorname{cosec} \theta$

Q29. If $\sec \theta = x + \frac{1}{4x}$, prove that $\sec \theta + \tan \theta = 2x$ or $\frac{1}{2x}$.

Q30. Find HCF and LCM of 404 and 96 and verify that $\text{HCF} \times \text{LCM} = \text{Product of the two given numbers}$

Q31. Draw the graph of the equations $x - y + 1 = 0$ and $3x + 2y - 12 = 0$. Determine the coordinates of the vertices of the triangle formed by these lines and the x-axis.

SECTION D

2. The length of the sides forming right angle of right angled triangle are $(5x)$ cm and $(3x-1)$ cm. If the area of the triangle is 60 cm^2 , find its hypotenuse.

OR

Solve for x :

$$\frac{1}{x+1} + \frac{3}{5x+1} = \frac{5}{x+4}$$

33. If one zero of the quadratic polynomial $f(x) = 4x^2 - 8kx + 8x - 9$ is negative of the other, then find zeroes of $kx^2 + 3kx + 2$.

34. From a point on the ground, the angles of elevation of the bottom and the top of a transmission tower fixed at the top of a 20 m building are 45° and 60° , respectively. Find the height of the tower.

OR

The lower window of a house is at a height of 2 m above the ground and its upper window is 4 m vertically above the lower window. At certain instant the angles of elevation of a balloon from these windows are observed to be 60° and 30° respectively. Find the height of balloon above the ground.

- Q35. A girl of height 90 cm is walking away from the base of a lamp-post at a speed of 1.2 m/sec. If the lamp is 3.6 m above the ground, find the length of her shadow after 4 seconds.

SECTION - E

- Q36. Your friend wants to participate in a 200 m race. He can currently run that distance in 51 sec and with each day of practice it takes him 2 sec less. He wants to do it in 31 seconds.

Answer the following questions:

- What is the minimum number of days he needs to practise till his goal is achieved?
- If the n th term of an A.P. is given by $a_n = 2n + 3$, then find the common difference of the A.P.
- (i) Find the time taken by him to run 200 m on the 6th day of practice.

OR

- (ii) Find the value of X , for which $2x$, $x+10$, $3x+2$ are three consecutive term of an A.P.

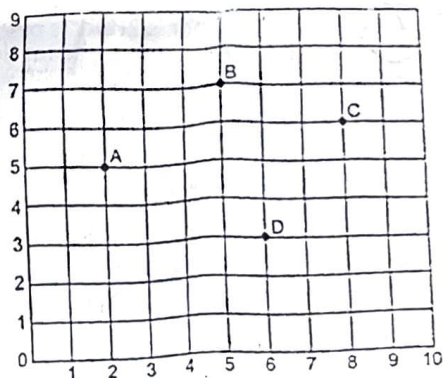
- Q37. Students of a school are standing in rows and columns in their school playground to celebrate their annual sports day. A, B, C and D are the positions of four students as shown in the figure.

Answer the following questions:

- Find the distance between A and C.
- Find the coordinates of the mid-point of the line segment AC.
- (i) If the sports teacher is sitting at the origin, then which of the four students is closest?

OR

- (ii) If a point P divides the line segment AD in the ratio 1:2, then find the coordinates of P.



- Q38. A Test consists of true or false questions. One mark is awarded for every correct answer, while $\frac{1}{4}$ mark is deducted for every wrong answer. A student knew answers to some of the questions. Rest of the questions he attempted by guessing. He answered 120 questions and got 90 marks.

Answer the following questions:

- If answer to all questions he attempted by guessing were wrong, then how many questions did he answer correctly?
- How many questions did he guess?
- If answers to all questions he attempted by guessing were wrong and answered 80 correctly, then how many marks he got?

OR

If answers to all questions he attempted by guessing were wrong, then how many questions answered correctly to score 95 marks?