# TECHNO INDIA GROUP PUBLIC SCHOOL

**MOCK TEST**                                                          **CLASS-X**

# MATHEMATICS

## SET–IV

Code: 041

Time : 3 hours                                                          F.M.: 80

---
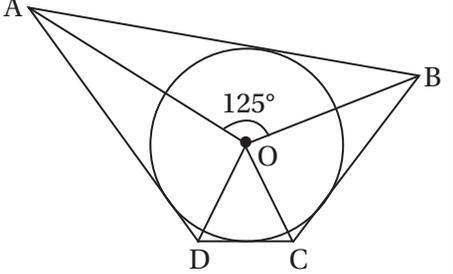
**General Instructions:**

**Read the following instructions very carefully and strictly follow them:**

1. This Question paper contains **38** questions.
2. This Question paper is divided into **five** sections–**A, B, C, D** and **E**.
3. In **Section A**, Questions no. **1** to **18** are **multiple choice questions (MCQs)** and Questions no. **19** and **20** are **Assertion-Reason based** questions of **1 mark each**.
4. In **Section B**, Questions no. **21** to **25** are **Very Short Answer (VSA)–type** questions, carrying **2 marks each**.
5. In **Section C,** Questions no. **26** to **31** are **Short Answer (SA)–type** questions, carrying **3 marks each**.
6. In **Section D,** Questions no. **32** to **35** are **Long Answer (LA)–type** questions, carrying **5 marks each**.
7. In **Section E,** Questions no. **36** to **38** are **Case study-based questions**, carrying **4 marks each** with sub parts of the values of **1, 1** and **2 marks each** respectively.
8. 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**.
9. Draw neat and clean figures wherever required.
10. Take $\pi = \dfrac{22}{7}$ wherever required if not stated.
11. Use of calculators is not allowed.

---

## SECTION A

### Section A consists of 20 questions of 1 mark each.

| 1. | If the zeros of the quadratic polynomial $x^2 + (a + 1) x + b$ are 2 and -3, then | [1] |
|---|---|---|
| | Ⓐ  a = −7, b = −1            Ⓑ  a = 5, b = −1 | |
| | Ⓒ  a = 2, b = −6            Ⓓ  a = 0, b = −6 | |
| 2. | The value of k for which the system of equations $kx + y = 0$ and $x - y = 0$ has unique solution. | [1] |
| | Ⓐ  0            Ⓑ  1            Ⓒ  $\dfrac{1}{2}$            Ⓓ  all of these | |

| | | |
|---|---|---|
| 3. | In fig., if $\angle AOB = 125°$, then $\angle COD$ is equal to  Ⓐ 62.5° Ⓑ 45° Ⓒ 35° Ⓓ 55° | [1] |
| 4. | If $n^{th}$ term of an AP is $3n - 5$, then the common difference of the A.P is <br> Ⓐ 3     Ⓑ 3n     Ⓒ –5     Ⓓ 5 | [1] |
| 5. | Two cubes each of volume 27 $cm^3$ are joined together. Find the surface area of the resulting solid? <br> Ⓐ 109.4 $cm^2$    Ⓑ 126 $cm^2$    Ⓒ 90 $cm^2$    Ⓓ 189.4 $cm^2$ | [1] |
| 6. | If $\dfrac{\sin\theta}{5} = \dfrac{\cos\theta}{2}$, then find $\dfrac{4\tan\theta+1}{4\tan\theta-1} = ?$ <br> Ⓐ $\dfrac{11}{9}$    Ⓑ $\dfrac{3}{2}$    Ⓒ $\dfrac{9}{11}$    Ⓓ 4 | [1] |
| 7. | In two triangles, DEF and PQR, $\angle D = \angle Q$ and $\angle R = \angle E$, then which of the following is not true? <br> Ⓐ $\dfrac{EF}{PR} = \dfrac{DF}{PQ}$    Ⓑ $\dfrac{EF}{RP} = \dfrac{DE}{PQ}$    Ⓒ $\dfrac{DE}{QR} = \dfrac{DF}{PQ}$    Ⓓ $\dfrac{EF}{RP} = \dfrac{DE}{QR}$ | [1] |
| 8. | A quadratic polynomial having zeroes $\sqrt{\pi}$ and $-\sqrt{\pi}$ is <br> Ⓐ $x^2 - \pi$    Ⓑ $x^2 + \pi$    Ⓒ $\pi^2 - x^2$    Ⓓ none of these | [1] |
| 9. | If the median of 21 observations is 40 and if the observations greater than the median are increased by 5 then the median of the new data will be <br> Ⓐ 45    Ⓑ 40    Ⓒ 41    Ⓓ 42 | [1] |
| 10. | Mean of first 10 positive integers is <br> Ⓐ 55    Ⓑ 5.5    Ⓒ 50    Ⓓ 5.0 | [1] |
| 11. | What will be the value of k, if the roots of the equation $(k - 4)x^2 - 2kx + (k + 5) = 0$ are equal? <br> Ⓐ 18    Ⓑ 19    Ⓒ 20    Ⓓ 21 | [1] |
| 12. | If $\theta = 10°$, then the value of $3 \tan 3\theta$ is <br> Ⓐ 1    Ⓑ $\dfrac{1}{\sqrt{3}}$    Ⓒ $\dfrac{3}{\sqrt{3}}$    Ⓓ not defined | [1] |
| 13. | Find the surface area of the given solid which is in the form of a cone mounted on a hemisphere. The radius and height of the cone are 5cm and 12cm. <br> Ⓐ 214.4 $cm^2$    Ⓑ 279.53 $cm^2$    Ⓒ 361.43 $cm^2$    Ⓓ 72.5 $cm^2$ | [1] |
| 14. | In a bag containing 24 balls, 4 are blue, 11 are green, 5 are red and the rest are white. One ball is drawn at random. The probability that drawn ball is white in colour is <br> Ⓐ $\dfrac{1}{6}$    Ⓑ $\dfrac{3}{8}$    Ⓒ $\dfrac{11}{24}$    Ⓓ $\dfrac{5}{8}$ | [1] |

| 15. | In what ratio does the point $\left(-\dfrac{19}{3}, \dfrac{7}{3}\right)$ divide the line segment joining A(3, 7) and B(–11, 0)? | [1] |
|---|---|---|
| | Ⓐ 3 : 2     Ⓑ 2 : 3     Ⓒ 2 : 5     Ⓓ 2 : 1 | |
| 16. | Which of the following gives the most occurring observation of the data? | [1] |
| | Ⓐ mean     Ⓑ median     Ⓒ mode     Ⓓ range | |
| 17. | What will be the length of the median through the vertex A, if the coordinates of the vertices of ΔABC are A(2, 5), B(5, 0), C(–2, 5)? | [1] |
| | Ⓐ $\sqrt{\dfrac{113}{3}}$ units    Ⓑ $\sqrt{\dfrac{13}{2}}$ units    Ⓒ $\sqrt{\dfrac{113}{2}}$ units    Ⓓ $\sqrt{\dfrac{13}{3}}$ units | |
| 18. | A card is drawn from a well shuffled deck of playing cards. The probability of getting black face card is | [1] |
| | Ⓐ $\dfrac{3}{13}$     Ⓑ $\dfrac{1}{2}$     Ⓒ $\dfrac{3}{52}$     Ⓓ $\dfrac{3}{26}$ | |
| | **Assertion Reason based Questions (19–20):** | |
| | **Directions:** In the following questions, a statement of assertion (A) is followed by a statement of Reason (R). Choose the correct answer out of the following choices. | |
| | (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. | |
| 19. | **Assertion:** The HCF of 31 and 200 = 1<br><br>**Reason:** The HCF of co-prime numbers is 1. | [1] |
| 20. | **Assertion:** If the radius of sector of a circle is reduced to its half and the angle is doubled then the perimeter of the sector remains the same.<br><br>**Reason:** The length of the arc subtending angle $\theta$ (in degree) at the centre of a circle of radius<br> $r = \dfrac{\pi r\theta}{180°}$. | [1] |

## SECTION B

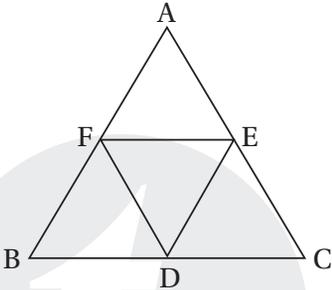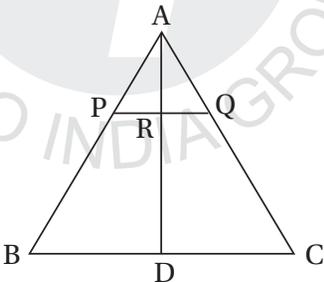### Section B consists of 5 questions of 2 marks each.

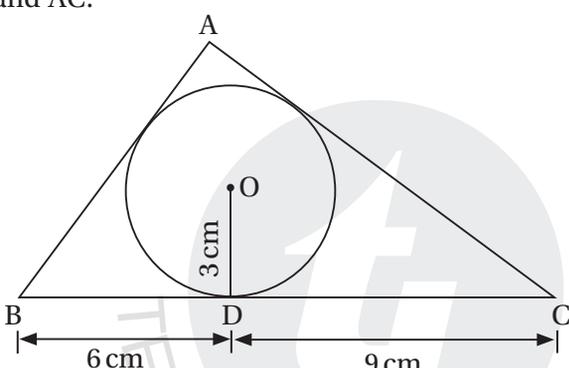| 21. | (A) Find the HCF and LCM of 96 and 360 by using fundamental theorem of arithmetic.<br><div align="center">**OR**</div><br>(B) Find the largest number which divides 70 and 125 leaving remainder 5 and 8 respectively. | [2] |
|---|---|---|
| 22. | (A) Two dice are rolled together bearing numbers 1, 2, 3, 4, 5, 6. Find the probability that the product of numbers obtained is an odd number.<br><div align="center">**OR**</div><br>(B) How many positive three digit integers have unit digit 5? Find the probability of selecting one such number out of all three digit numbers. | [2] |

| 23. | If $\sqrt{3}\,\sin\theta = \cos\theta$, find the value of $\dfrac{3\cos^2\theta + 2\cos\theta}{3\cos\theta + 2}$ | [2] |
|---|---|---|
| 24. | Find the point (s) on the x-axis which is at a distance of 5 units from the point (–1, 0). | [2] |
| 25. | Let P and Q be the points of trisection of the line segment joining the points A (2, –2) and B (–7, 4) such that P is nearer to A. Find the coordinates of P | [2] |

## SECTION C

### Section C consists of 6 questions of 3 marks each

| 26. | (A) In ΔABC, D, E and F are midpoints of BC, CA and AB respectively. Prove that ΔABC ~ ΔDEF ~ ΔEDC. <br><br>  <br><br> **OR** <br><br> (B) In ΔABC, P and Q are points on AB and AC respectively such that PQ is parallel to BC. If AD drawn from A on BC intersect PQ at R, then show that PR × DC = RQ × BD. <br><br>  | [3] |
|---|---|---|
| 27. | The product of Rachna's age two years ago and her age four years from now is one more than twice her present age. What is her present age? | [3] |
| 28. | If $\alpha$ and $\beta$ are zeroes of a polynomial $6x^2 - 5x + 1$, then form a quadratic polynomial whose zeroes are $\dfrac{\alpha}{\beta}$ and $\dfrac{\beta}{\alpha}$. | [3] |
| 29. | If $x = a\cos\theta - b\sin\theta$ and $y = a\sin\theta + b\cos\theta$, then prove that $a^2 + b^2 = x^2 + y^2$. | [3] |
| 30. | (A) The minute hand of a wall clock is 15 cm long. Find the area of the face of the clock described by the minute hand in 25 minutes. <br><br> **OR** <br><br> (B) AB is a chord of a circle centred at O such that $\angle AOB = 60°$. If OA = 14 cm, then find the area of the major segment. (take $\sqrt{3} = 1.73$) | [3] |
| 31. | Prove that $\sqrt{2}$ is an irrational number. | [3] |

## SECTION D

### Section D consists of 4 questions of 5 marks each

| 32. | (A) Solve graphically: $y = \dfrac{3-x}{2}$ and $y = \dfrac{2x+8}{3}$ <br><br> Let T$(\alpha, \beta)$ be the solution of the given equations. Find OT where O is origin. <br><br> **OR** <br><br> (B) Places A and B are 200 km apart on a highway. One car starts from A and another car from B at the same time. If the car travels in the same direction at different speeds, they meet in 10 hours. If they travel towards each other with the same speeds as before, they meet in 2 hours. What are the speeds of the two cars? | [5] |
|---|---|---|
| 33. | In the figure, a ΔABC is drawn to circumscribe a circle of radius 3 cm, such that the segments BD and DC are respectively of lengths 6 cm and 9 cm. If the area of ΔABC is 54 cm², then find the lengths of sides AB and AC. <br><br>  | [5] |
| 34. | A boy whose eye level 1.65 m from the ground, spots a balloon moving with the wind in a horizontal line at some height from the ground. The angle of elevation of the balloon from the eyes of the boy at an instant is 45°. After 10 seconds, the angle of elevation reduces to 30°. If the speed of the wind is 3m/s, then find the height of the balloon from the ground. (use $\sqrt{3} = 1.73$) | [5] |
| 35. | (A) Monthly pocket money of students of a class is given in the following frequency distribution: <br><br> | Pocket money (in ₹) | No. of students | <br> |---|---| <br> | 100–125 | 14 | <br> | 125–150 | 8 | <br> | 150–175 | 12 | <br> | 175–200 | 5 | <br> | 200–225 | 11 | <br><br> Find mean pocket money. | [5] |

**OR**

(B) Weekly income of 600 families is given below:

| Income in (₹) | No. of families |
|---|---|
| 0–1000 | 250 |
| 1000–2000 | 190 |
| 2000–3000 | 100 |
| 3000–4000 | 40 |
| 4000–5000 | 15 |
| 5000–6000 | 5 |

Find the median.

## SECTION E

**Section E consists of 3 questions of 4 marks each.**

36. Two roads are intersecting at right angle as shown in figure.
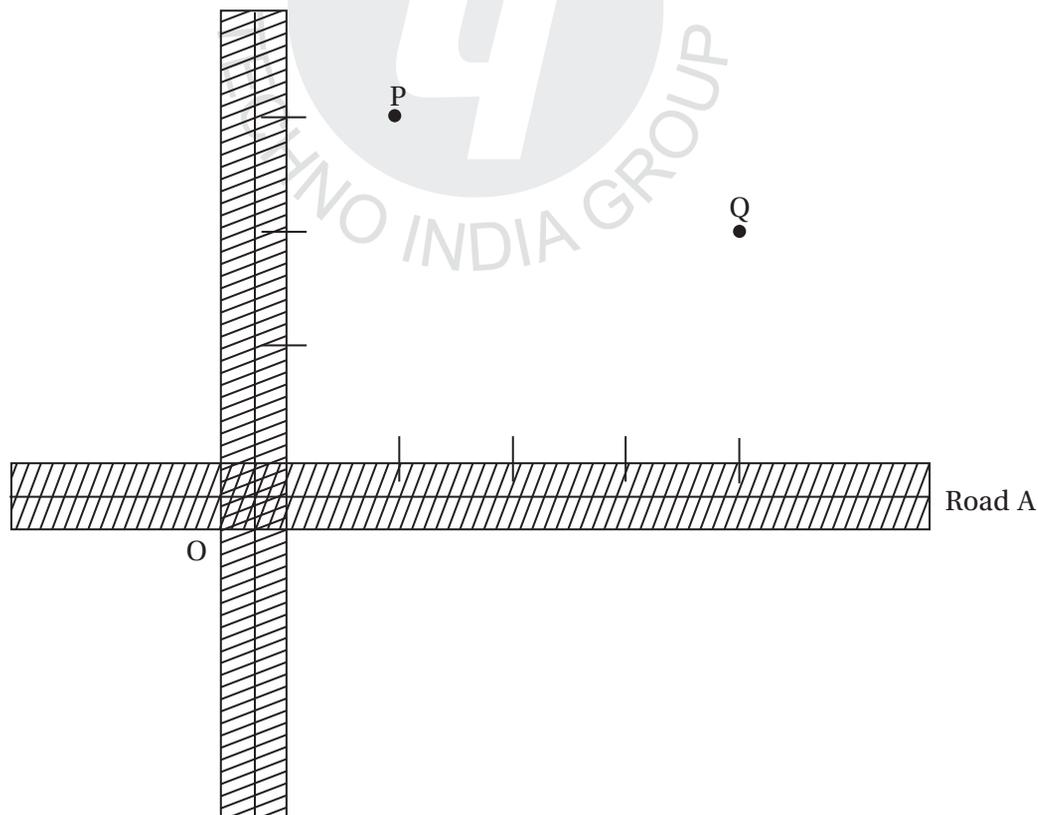


[1]
[1]
[2]

Taking road A as x-axis, road B as y-axis and point of intersection O as origin. The house of Ramesh and Raj are at points P(1, 3) and Q(4, 2) respectively.

| | | |
|---|---|---|
| | On the basis of above, answer the following : | |
| | (i) Find the distance of Ramesh's house from origin. | |
| | (ii) Find the distance between Ramesh's and Raj's house. | |
| | (iii)(A) If Sheetal's house is at road A such tthat her house is equidistant from Raj's and Ramesh's house, find the coordinates of the point where Sheetal's house is located. | |
| | **OR** | |
| | (B) Find the length of median of ΔOPQ through vertex P. | |
| 37. | A man accepts a position with an initial salary of ₹ 5200 per month. It is understood that he will receive an automatic increase of ₹ 320 in the every next month and each month thereafter. He joins the job on 1st March 2022 and he receives his salary on the last day of every month. | [1] [1] [2] |
| | Now on the basis of above, answer the following : <br> (i) Find the amount of salary received on 30th November 2022. <br> (ii) When will he get ₹ 10,000 as his monthly salary? <br> (iii)(A) Find the total earning during his first year of job. <br> **OR** <br> (B) When will his total earning be ₹ 36,000. | |
| 38. | A boy is standing at the top of a lighthouse of height 100 m and observes that two boats approaching to lighthouse from opposite sides. Boy found that the angle of depression of both the boats are 45° and 30°. | [1] [1] [2] |
| | On the basis of above answer the following : <br> (i) Draw a labelled diagram of the situation. <br> (ii) Find the distance of the boat from the lighthouse whose angle of depression is 45°. <br> (iii)(A) What is the distance between both the boats. <br> **OR** <br> (B) If angle of depression of boats become 60° and 45°, then find the distance between the boats. | |