Aakash
+BYJU'S

Mock Test Paper

Class - X

Mathematics
(Standard)

MM : 80   Mock Test Paper (Maths-Standard) - Class-X (2023-24)   **Time : 180 Min.**

Topics Covered:
Mathematics: Complete Syllabus (As Prescribed by CBSE for the Session 2023-24)

General Instructions :
(i) This question paper contains **38 questions**. All questions are compulsory.
(ii) Question paper is divided into **FIVE Sections** - Section **A, B, C, D** and **E.**
(iii) In **Section A** - question number **1 to 18** are **Multiple Choice Questions (MCQs)** and question number **19 and 20** are **Assertion-Reason based Questions** of **1 mark** each.
(iv) In **Section B** - question number **21 to 25** are **Very Short Answer (VSA)** type questions of **2 marks** each.
(v) In **Section C** - question number **26 to 31** are **Short Answer (SA)** type questions carrying **3 marks** each.
(vi) In **Section D** - question number **32 to 35** are **Long Answer (LA)** type questions carrying **5 marks** each.
(vii) In **Section E** - question number **36 to 38** are **Source based/Case based Units of Assessment Questions** carrying **4 marks** each. Internal choice is provided in 2 marks question in each case study.
(viii) There is no overall choice. However, an internal choice has been provided in **2 questions** in **Section B**, **2 questions** in **Section C**, **2 questions** in **Section D** and **3 questions in Section E.**

MATHEMATICS

SECTION-A : Multiple Choice Type Questions (20×1 = 20 Marks)

Q1. If $HCF(k_1, k_2) = k_3$, then $LCM(k_1, k_2)$ is always equal to   **[1]**

(1) $\frac{k_1 k_3}{k_2}$ (2) $k_1 k_2 k_3$

(3) $\frac{k_2 k_1}{k_3}$ (4) $\frac{k_2 k_3}{k_1}$

Q2. If the product of zeroes of the polynomial $(ax^2 - 6x - 6)$ is 4, then the value of a is   **[1]**

(1) $\frac{2}{3}$ (2) $\frac{3}{2}$

(3) $\frac{-2}{3}$ (4) $\frac{-3}{2}$

Q3. If the zeroes of the quadratic polynomial $x^2 + (a + 1)x + b$ are 2 and –3, then   **[1]**

(1) $a = -7, b = -1$ (2) $a = 5, b = -1$

(3) $a = 2, b = -6$ (4) $a = 0, b = -6$

Q4. If 2 is added to each of the numerator and the denominator of a fraction, then the fraction becomes $\frac{1}{3}$. Also, if **[1]** 4 is subtracted from each of the numerator and the denominator, then the fraction becomes $\frac{1}{4}$. The sum of the numerator and the denominator of the original fraction is

(1) 19   (2) 60

(3) 64   (4) 68

Q5. The lines $4x + 3y = 13$ and $8x + 6y + 26 = 0$ **[1]**

(1) Intersect each other at (2, 1)   (2) Intersect at (1, 2)

(3) Are parallel to each other   (4) Coincide with each other

Q6. The quadratic equation $x^2 + 4x - 7 = 0$ has **[1]**

(1) Real and equal roots   (2) Real and unequal roots

(3) No real roots   (4) No roots at all

Q7. The 10th term of the AP 7, 11, 15, 19, … is **[1]**

(1) 43   (2) 33

(3) 47   (4) 39

Q8. If the 5th and 8th term of an A.P are 15 and 30 respectively, then the sum of first 11 terms is **[1]**

(1) 50   (2) 40

(3) 220   (4) 300

Q9. If $3x + 5y = 21$ and $6x + 2y = 18$, then the value of $y^2 - x^2$ is **[1]**

(1) 12   (2) 16

(3) 5   (4) 3

Q10. If three vertices of a parallelogram $ABCD$ are $A(-5, 0)$, $B(3, 0)$ and $C(8, 5)$ with AC as one of the diagonals, **[1]** then the coordinates of vertex D are given by

(1) (5, 0)   (2) (1, 2)

(3) (3, 4)   (4) (0, 5)

Q11. The value of $\frac{\cos^2 60° - 7\tan^2(45°) + 8\cosec^2 60°}{\sin^2 45° - 5\cos^2 90° + 3\sin(30°)}$ is equal to **[1]**

(1) $\frac{51}{13}$ (2) $\frac{47}{24}$

(3) $\frac{47}{12}$ (4) $\frac{11}{3}$

Q12. The angle of depression which a man makes while viewing a stationary car from the top of a building 45 m **[1]** high is 30º. At what approximate distance is the car positioned from the building?

(1) 51.88 m   (2) 77.94 m

(3) 25.98 m   (4) 38.97 m

Q13. In the given figure, diameter of circle is 24 cm and OP = 20 cm (O is centre), the length of the tangent PT of **[1]** the circle is
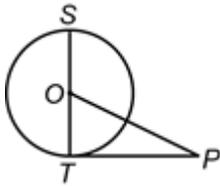
(1) 10 cm   (2) 12 cm

(3) 32 cm   (4) 16 cm

Q14. If the radius of a circle is 16 cm, then the area of quadrant of the circle is **[1]**

(1) 35π cm^2 (2) 64π cm^2

(3) $\frac{4}{\pi}$ cm^2 (4) $\frac{35}{\pi}$ cm^2

Q15. The least value of 'n' for which 3 + 6 + 9 + …… to 'n' terms exceeds 500 is **[1]**

(1) 17   (2) 18

(3) 19   (4) 20

Q16. Two cubes, each of edge 2 cm long are placed together. The total surface area of the cuboid formed is **[1]**

(1) 40 cm^2 (2) 36 cm^2

(3) 12 cm^2 (4) 96 cm^2

Q17. A coin is tossed 3 times. The probability of getting at least two tails is **[1]**

(1) $\frac{1}{4}$ (2) $\frac{3}{8}$

(3) $\frac{1}{2}$ (4) $\frac{1}{8}$

Q18. The distance between (3, –3) and (–4, –2) is equal to **[1]**

(1) $2\sqrt{5}$ units   (2) $\sqrt{26}$ units

(3) $\sqrt{74}$ units   (4) $5\sqrt{2}$ units

Q19. In the following questions, a statement of **Assertion (A)** is followed by a statement of **Reason (R)**. **[1]**
A : If the probability that it will not rain tomorrow is 0.35, then the probability that it will rain tomorrow is 0.55.
R : If the probability of occurrence of an event E is P, then probability that the event E will not occur is $1 - P$.

(1) Both (A) and (R) are true and (R) is the correct explanation of (A)
(2) Both (A) and (R) are true but (R) is not the correct explanation of (A)

(3) (A) is true but (R) is false
(4) (A) is false but (R) is true

Q20. In the following questions, a statement of **Assertion (A)** is followed by a statement of **Reason (R)**. **[1]**
A : The distance between two parallel tangents of a circle of radius 6 cm is 12 cm.
R : Distance between two parallel tangents of a circle of radius r is $2r$.

(1) Both (A) and (R) are true and (R) is the correct explanation of (A)
(2) Both (A) and (R) are true but (R) is not the correct explanation of (A)

(3) (A) is true but (R) is false
(4) (A) is false but (R) is true

SECTION-B : Very Short Answer Type Questions (5×2 = 10 Marks)

Q21. What is the nature of roots of the quadratic equation $x^2 + x + 1 = 0$? **[2]**

OR

Find the HCF of 64 and 200 by the prime factorisation method. **[2]**

Q22. Find the zeroes of the quadratic polynomial $2x^2 - x - 15$ and verify the relationship between the zeroes and the coefficients. **[2]**

Q23. Simplify : $(1 + \cot^2\theta) (1 - \cos\theta) (1 + \cos\theta)$ **[2]**

OR

If $\frac{\tan\theta}{\sqrt{3}} = 1$, then find the value of $2 \sin^2\theta - 3 \cos^2\theta$. **[2]**

Q24. An integer is chosen at random between 1 and 80. Find the probability that it is not divisible by 5. **[2]**

Q25. Find whether the equations $3x + 4y = 12$ and $6x + 8y = 24$ represent a pair of coincident lines. **[2]**

SECTION-C : Short Answer Type Questions (6×3 = 18 Marks)

Q26. Prove that $\sqrt{7}$ is an irrational number. **[3]**

Q27. The sum of a two-digit number and the number obtained by interchanging the digits is 110. If the digits of the number differ by 4, then find the original number. [Assume, digit at tens place is less than the digit at unit place.] **[3]**

Q28. The length of the minute hand of a clock is 14 cm. Find the areas swept by the minute hand during the time period 4 : 15 am and 4 : 50 am. **[3]**

OR

Show that the points $P(-3, -4)$, $Q(3, -4)$, $R(3, 2)$ and $S(-3, 2)$ are vertices of a square. **[3]**

Q29. A tent is in the shape of a cylinder surmounted by a conical top with equal base radius. If height and diameter of the cylindrical part are 4.2 m and 8 m respectively and the slant height of the conical top is 5.6 m, find the area of the canvas used for making the tent. **[3]**

Q30. If three or more parallel lines are intersected by two transversals, then prove that the intercepts made by them on the transversals are proportional. **[3]**

OR

Prove that $(\tan\theta + 3)(3 \tan\theta + 1) = 3\sec^2\theta + 10 \tan\theta$. **[3]**

Q31. What is the probability that a number selected at random from the numbers 1, 2, 3, 4, 5, 6 …….. 50 is a prime number? **[3]**

SECTION-D : Long Answer Type Questions (4×5 = 20 Marks)

Q32. The angles of depression of two ships on opposite sides of a lighthouse of height 30 m as observed from the top of the lighthouse are 30° and 45°. Which ship will reach the lighthouse first? (Assume speed of ships is same) **[5]**

OR

A bookseller purchased 527 books out of which 153 books are of Social Science and the remaining books of Science. Each book has same size. Social Science and Science books are to be packed in separate bundles and each bundle must contain same number of books. Find the least number of bundles. **[5]**

Q33. Point P divides the line segment joining the points $X(3, 1)$ and $Y(6, -8)$ such that $\frac{XY}{YP} = \frac{4}{1}$. If P lies on the line $2x + y + k = 0$. Find the value of k. **[5]**
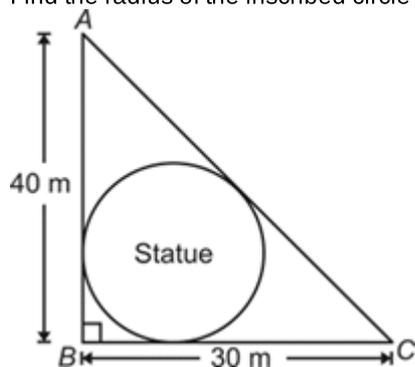
OR

State and prove Basic Proportionality Theorem. **[5]**

Q34. If the median of the following distribution is 57.5, then find the value of x. **[5]**

Classes	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60	60 – 70	70 – 80	80 – 90	90 – 100
Frequency	5	10	11	x	27	38	40	29	14	6

Q35. Find the radius of the inscribed circle as shown in figure. **[5]**

SECTION-E : Source-based / Case-based Units of Assessment (3×4 = 12 Marks)

Q36. An A.P. of 80 terms has first term 4 and common difference 5. Answer the following questions based on this.

(a) Find the last term of A.P. **[1]**

(b) Find the sum of first term and last term. **[1]**

(c) Find the middlemost term of A.P. **[2]**

or

(c) Find the sum of all the tems of A.P. **[2]**

Q37. For the following grouped frequency distribution. Answer the following questions.

Class	3–6	6–9	9–12	12–15
Frequency	2	5	10	23

(a) What is the modal class of given data? **[1]**

(b) Find the lower limit of median class. **[1]**

(c) What is median of the given data (approx.)? **[2]**

or

(c) Find the mean of the given data. **[2]**

Q38. Two poles *A* and *B* are standing opposite to each other on either side of the road. The height of pole *A* is 16 m. The angle of depression of foot of pole *B* from top of pole *A* is 45º and the angle of depression of foot of pole *A* from top of pole *B* is 60º.

(a) What is the height of pole *B*? **[1]**

(b) Find the distance between foot of both the poles. **[1]**

(c) Find the distance between top of pole *B* and foot of pole *A.* **[2]**

or

(c) Find the distance between top of pole *A* and foot of pole *B.* **[2]**

Aakashians Create History
in International Olympiads (Classroom Students)

IBO 2023

Gold Medalists
34th International Biology Olympiad

Dhruv Advani

Rohit Panda

Chirag Falor	Dhiren Bhardwaj	Anshul	Amritansh Nigam	Prachi Jindal	Tanishka Kabra
IOAA 2019 Gold Medalist	**IBO** 2021 Silver Medalist	**IBO** 2021 Silver Medalist	**IBO** 2022 Silver Medalist	**IBO** 2022 Silver Medalist	**IChO** 2022 Silver Medalist
International Olympiad on Astronomy & Astrophysics	32nd International Biology Olympiad	32nd International Biology Olympiad	33rd International Biology Olympiad	33rd International Biology Olympiad	54th International Chemistry Olympiad

Excellent Performance by Aakashians in NSEs, IOQM, NSO-II, IMO-II & INOs

201 Classroom Students Aakashians Qualified in NSEs 2022-23	**63** Classroom Students Aakashians Qualified in IOQM 2023	**783** 774 Classroom + 09 Digital & Distance Aakashians Qualified in NSO (Level-II) 2023	**601** 590 Classroom + 11 Distance & Digital Aakashians Qualified in IMO (Level-II) 2023	**39** Classroom Students Aakashians Qualified for OCSCs/IMOTC /APMO 2023

NSEs -National Standard Examinations | **IOQM** - Indian Olympiad Qualifier in Mathematics | **NSO** - National Science Olympiad
IMO - International Mathematics Olympiad | **INOs** - Indian National Olympiads | **OCSCs** - Orientation cum Selection Camps,
IMOTC - International Mathematical Olympiad Training Camp, **APMO -** Asian Pacific Mathematics Olympiad

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107009 Aakashians Qualified in NEET (UG) 2023
(94893 Classroom + 12116 Distance & Digital)

Our Top Performers

AIR 3 716/720
Kaustav Bauri
2 Year Classroom

AIR 5 KARNATAKA TOPPER 715/720
Dhruv Advani
3 Year Classroom

AIR 6 715/720
Surya Siddharth N
4 Year Classroom

AIR 8 ODISHA TOPPER 715/720
Swayam Shakti T
3 Year Classroom

2340 Aakashians Qualified in JEE (Advanced) 2023
(2160 Classroom + 180 Distance & Digital)

Our Top Performers

AIR 27
Aditya Neeraje
2 Year Classroom

AIR 28
Aakash Gupta
1 Year Classroom

AIR 29
Tanishq Mandhane
4 Year Classroom

AIR 31
Kamyak Channa
4 Year Classroom

AIR 36
Dhruv Sanjay Jain
4 Year Classroom

AIR 42
Shivanshu Kumar
4 Year Classroom

and many more...