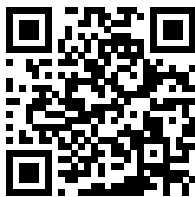


Series: AM311



SESSION – 2

Subject Code: MO

Roll No.:

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Candidates must write the Roll No on the title page of the Question Paper.

Mathematics | Level 3

Time allowed: 1.5 hours

Maximum Marks: 150

Instructions for Candidates:

1. Please verify that this question paper contains **12** printed pages and Ensure that the paper contains a total of **50** questions.
2. Use of mobile phones, smartphones, ipads during examination is **STRICTLY PROHIBITED**.
3. On the OMR sheet, enter all required information carefully in the space provided **ONLY IN BLOCK CAPITALS** and by properly darkening the corresponding bubbles. Incomplete, incorrect, or careless entries may lead to disqualification.
4. Use only a **BLUE or BLACK BALL POINT PEN** for writing entries and filling bubbles. Pencils or other pens are not permitted.
5. **Marking Scheme:** Each question has four alternatives, only one of which is correct. Select the correct option and darken the respective bubble.
 - Each correct answer carries **3 marks**.
 - Each incorrect answer attracts a penalty of **1 mark**.
 - No marks are awarded for unanswered questions.
6. Use only the space provided in the question paper for rough work.
7. Candidates must remain in the examination hall until the exam is officially over. Early exit is not allowed.
8. Do not make stray marks, symbols, or extra writing on the OMR sheet. Fill only the designated bubbles neatly.
9. Since OMR sheets are machine evaluated, changes in entries are **strictly not allowed**.
10. Avoid scratching, overwriting, or erasing, as these may result in wrong evaluation.
11. **DO NOT write anything on the back side** of the OMR sheet.

1. The product of a rational and an irrational numbers is:

- (A) Always an integer
- (B) Always a rational number
- (C) Always an irrational number
- (D) Sometimes rational and sometimes irrational

2. The value of the polynomial $7x^4 + 3x^2 - 4$, when $x = -2$ is:

- (A) 100
- (B) 110
- (C) 120
- (D) 130

3. Simplify:

$$\frac{\sqrt{5} + \sqrt{3}}{\sqrt{80} + \sqrt{48} - \sqrt{45} - \sqrt{27}}$$

- (A) $\frac{1}{2}$
- (B) 4
- (C) $\frac{\sqrt{15}}{8}$
- (D) 1

4. Simplify:

$$\frac{155 \times 155 + 155 \times 55 + 55 \times 55}{155 \times 155 - 55 \times 55}$$

- (A) 1
- (B) 0.001
- (C) 0.01

(D) 0.1

5. Euclid's geometry is based on:

- (A) Inductive reasoning
- (B) Deductive reasoning
- (C) Observations only
- (D) Experimental proofs

6. When the sum of two adjacent angles is 180° , what is the position of their non-common arms?

- (A) They are perpendicular
- (B) They form a right angle
- (C) They form a straight line
- (D) They form an acute angle

7. Which of the points $P(0, 3)$, $Q(1, 0)$, $R(0, -1)$, $S(-5, 0)$, $T(1, 2)$ do not lie on the x -axis?

- (A) P and R only
- (B) Q and S only
- (C) P , R and T
- (D) Q , S and T

8. Given $\text{HCF}(2520, 6600) = 120$ and $\text{LCM}(2520, 6600) = 252k$, then the value of k is:

- (A) 165
- (B) 550
- (C) 990
- (D) 1650



9. A railway half ticket costs half the full fare but the reservation charges are the same on a half ticket as on a full ticket. One reserved first class ticket costs ₹2530. One reserved first class ticket and one reserved first class half ticket from stations A to B cost ₹3810. Find the full first class fare from stations A to B and also the reservation charges for a ticket.
- (A) ₹2400, ₹130
(B) ₹2500, ₹30
(C) ₹2600, ₹70
(D) ₹2550, ₹60
10. A peacock is sitting on the top of a pillar, which is 9 m high. From a point 27 m away from the bottom of the pillar, a snake is coming to its hole at the base of the pillar. Seeing the snake, the peacock pounces on it. If their speeds are equal, at what distance from the hole is the snake caught?
- (A) 9 m
(B) 10 m
(C) 12 m
(D) 15 m
11. The n th term of the A.P. $(1 + \sqrt{3})$, $(1 + 2\sqrt{3})$, $(1 + 3\sqrt{3})$, ... is:
- (A) $1 + n\sqrt{3}$
(B) $n + \sqrt{3}$
(C) $n(1 + \sqrt{3})$
(D) $n\sqrt{3}$
12. A triangle and a parallelogram have the same base and the same area. If the sides of the triangle are 26 cm, 28 cm and 30 cm, and the parallelogram stands on the base 28 cm, find the height of the parallelogram.
- (A) 12 cm
(B) 15 cm
(C) 19 cm
(D) None of these
13. The diameter of a roller is 84 cm and its length is 120 cm. It takes 500 complete revolutions to move once over to level a playground. The area of the playground in m^2 is:
- (A) 1584
(B) 1284
(C) 1384
(D) 1184
14. The area under a frequency polygon corresponds to:
- (A) Mean
(B) Range
(C) Class width
(D) Total frequency
15. SCD, TEF, UGH, ____, WKL
- (A) CMN
(B) UJI
(C) VIJ
(D) IJT
16. If n is a natural number divisible by 6, what can you definitely say about the prime factorization of n ?
- (A) It must be a perfect square
(B) It must contain 2 and 3 as prime factors
(C) It can be a prime number
(D) None of the above



17. If the zeroes of the quadratic polynomial $x^2 + (a + 1)x + b$ are 2 and -3, then:
- (A) $a = -7, b = -1$
(B) $a = 5, b = -1$
(C) $a = 2, b = -6$
(D) $a = 0, b = -6$
18. If the sum and product of the zeros of a quadratic polynomial are 3 and -10, respectively, then the quadratic polynomial is:
- (A) $x^2 - 3x - 10$
(B) $x^2 + 3x - 10$
(C) $x^2 - 3x + 10$
(D) $x^2 + 3x + 10$
19. If $16 \cot x = 12$, then $\frac{\sin x - \cos x}{\sin x + \cos x}$ equals:
- (A) 0
(B) $\frac{1}{7}$
(C) $\frac{2}{7}$
(D) $\frac{3}{7}$
20. It is found that on walking x meters towards a chimney in a horizontal line through its base, the elevation of its top changes from 30° to 60° . The height of the chimney is:
- (A) $3\sqrt{2}x$
(B) $2\sqrt{3}x$
(C) $\frac{\sqrt{3}}{2}x$
(D) $\frac{2}{\sqrt{3}}x$
21. If the angle of elevation of a cloud from a point 200 m above a lake is 30° and the angle of depression of its reflection in the lake is 60° , then the height of the cloud above the lake is:
- (A) 30 m
(B) 200 m
(C) 400 m
(D) 500 m
22. If two perpendicular tangents PA and PB are drawn from an external point to a circle of radius 4 cm, then the length of each tangent is:
- (A) 3 cm
(B) 4 cm
(C) 5 cm
(D) 6 cm
23. In a right-angled triangle ABC , right angled at B , $BC = 12$ cm and $AB = 5$ cm. The radius of the circle inscribed in the triangle (in cm) is:
- (A) 1
(B) 2
(C) 3
(D) 4
24. If a wire is bent into the shape of a square, then the area of the square is 81 cm^2 . When the wire is bent into a semi-circular shape, then the area of the semi-circle will be:
- (A) 22 cm^2
(B) 44 cm^2
(C) 77 cm^2
(D) 154 cm^2



25. If the circumference of a circle is diminished by 10%, then its area is diminished by:
- (A) Halved
 - (B) Doubled
 - (C) Tripled
 - (D) Quadrupled
26. A circus tent is cylindrical to a height of 4 m and conical above it. If its diameter is 105 m and its slant height is 40 m, the total area of the canvas required in m^2 is:
- (A) 1760
 - (B) 2640
 - (C) 3960
 - (D) 7920
27. The area of incircle of an equilateral triangle is 154 cm^2 . The perimeter of the triangle is:
- (A) 71.5 cm
 - (B) 71.7 cm
 - (C) 72.3 cm
 - (D) 72.7 cm
28. If a cone is cut into two parts by a horizontal plane passing through the mid-point of its axis, the ratio of the volume of the upper part and the whole cone is:
- (A) 1:2
 - (B) 1:4
 - (C) 1:6
 - (D) 1:8
29. The median of a given frequency distribution is found graphically with the help of:
- (A) Histogram
 - (B) Frequency curve
 - (C) Ogive
 - (D) Frequency polygon
30. For a frequency distribution, mean, median and mode are connected by the relation:
- (A) Mode = 3 Mean – 2 Median
 - (B) Mode = 2 Median – 3 Mean
 - (C) Mode = 3 Median – 2 Mean
 - (D) Mode = 3 Median + 2 Mean
31. If three coins are tossed simultaneously, then the probability of getting at least two heads is:
- (A) $\frac{3}{4}$
 - (B) $\frac{3}{8}$
 - (C) $\frac{1}{2}$
 - (D) $\frac{1}{4}$
32. If $a = 2^2 \times 3^x$, $b = 2^2 \times 3 \times 5$, $c = 2^2 \times 3 \times 7$ and $\text{LCM}(a, b, c) = 3780$, then x is equal to:
- (A) 0
 - (B) 1
 - (C) 2
 - (D) 3
33. The roots of the quadratic equation $x^2 + 2\sqrt{2}x - 6 = 0$ are:
- (A) $-\sqrt{2}, 3\sqrt{2}$
 - (B) $\sqrt{2}, 3\sqrt{2}$
 - (C) $\sqrt{2}, -3\sqrt{2}$
 - (D) $-\sqrt{2}, -3\sqrt{2}$



34. In $\triangle ABC$, if $AD \perp BC$, then which of these is always true?

- (A) $AC^2 = AB \times AD$
- (B) $AD^2 = AB \times AC$
- (C) $AB^2 = AC \times AD$
- (D) $AB \times AC = BC \times AD$

35. If $P(2, 4)$, $Q(0, 3)$, $R(3, 6)$ and $S(5, y)$ are the vertices of a parallelogram PQRS, then the value of y is:

- (A) 8
- (B) 7
- (C) -8
- (D) -7

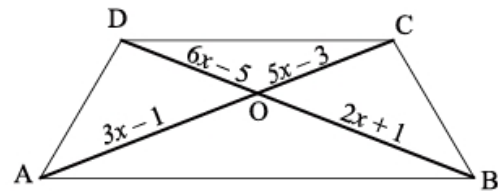
36. The point on the x-axis which is equidistant from points $(-1, 0)$ and $(5, 0)$ is:

- (A) $(0, 2)$
- (B) $(2, 0)$
- (C) $(3, 0)$
- (D) $(0, 3)$

37. $9 \sec^2 A - 9 \tan^2 A$ is equal to:

- (A) 0
- (B) 1
- (C) 8
- (D) 9

38. In the given figure, $AB \parallel DC$ and diagonals AC and BD intersect at O . If $OA = 3x - 1$, $OB = 2x + 1$, $OC = 5x - 3$ and $OD = 6x - 5$, the value of x is



- (A) $\frac{1}{2}$
- (B) 1
- (C) 2
- (D) $\frac{5}{2}$

39. If the centroid of the triangle formed by $(9, a)$, $(b, -4)$ and $(7, 8)$ is $(6, 8)$, then the values of a and b are:

- (A) $a = 4, b = 5$
- (B) $a = 5, b = 4$
- (C) $a = 5, b = 2$
- (D) $a = 20, b = 2$

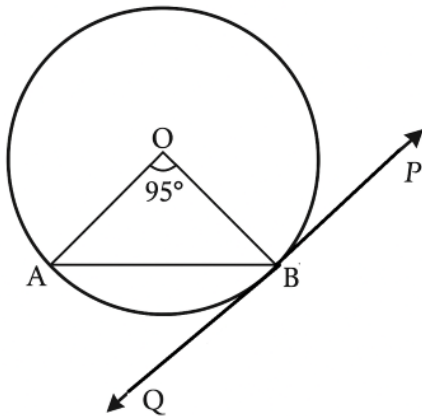
40. The rod AC of a TV disc antenna is fixed at right angles to the wall AB and a rod CD is supporting the disc as shown. If $AC = 1.5$ m and $CD = 3$ m, the value of:

- (i) $\tan \theta$
- (ii) $\sec \theta + \csc \theta$ is

- (A) $\tan \theta = \frac{1}{\sqrt{3}}, \sec \theta + \csc \theta = \frac{2}{\sqrt{3}} + 2$
- (B) $\tan \theta = \frac{1}{\sqrt{3}}, \sec \theta + \csc \theta = 2\sqrt{3} + 2$
- (C) $\tan \theta = \sqrt{3}, \sec \theta + \csc \theta = \frac{2}{\sqrt{3}} + 2$
- (D) $\tan \theta = \frac{1}{2}, \sec \theta + \csc \theta = \sqrt{3} + 2$

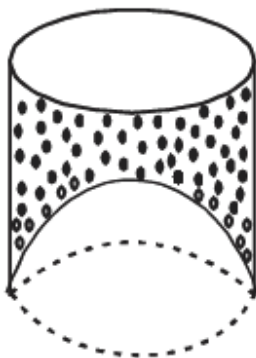
41. In the given figure, PQ is tangent to the circle centered at O . If $\angle AOB = 95^\circ$, then the measure of $\angle ABQ$ is:





- (A) 42.5°
 (B) 47.5°
 (C) 85°
 (D) 95°

42. A juice seller serves customers using glasses as shown in the figure. The inner diameter of the cylindrical glass is 5 cm, but the bottom has a hemispherical raised portion which reduces the capacity of the glass. If the height of the glass is 10 cm, find the *apparent* and *actual* capacities of the glass. [Use $\pi = 3.14$]



- (A) 196.25 cm^3 and 163.54 cm^3
 (B) 196.25 cm^3 and 166.25 cm^3

- (C) 200.00 cm^3 and 170.00 cm^3
 (D) 180.00 cm^3 and 150.00 cm^3

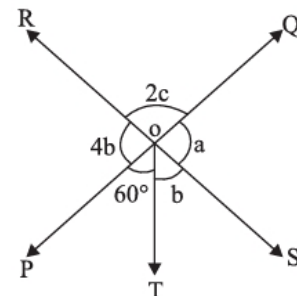
43. The median and mode respectively of a frequency distribution are 26 and 29. Then, its mean is:

- (A) 27.5
 (B) 24.5
 (C) 28.4
 (D) 25.8

44. 240 students reside in a hostel. Out of which 50% go for the yoga classes early in the morning, 25% go for the gym club and 15% of them go for the morning walk. The rest of the students have joined the laughing club. What is the probability of students who have joined the laughing club?

- (A) $\frac{1}{5}$
 (B) $\frac{1}{10}$
 (C) $\frac{3}{20}$
 (D) $\frac{1}{8}$

45. In the figure, two straight lines PQ and RS intersect each other at point O . If $\angle POT = 60^\circ$, find the values of a , b , and c .



- (A) $a = 96^\circ, b = 24^\circ, c = 42^\circ$
- (B) $a = 84^\circ, b = 24^\circ, c = 48^\circ$
- (C) $a = 90^\circ, b = 30^\circ, c = 45^\circ$
- (D) $a = 120^\circ, b = 24^\circ, c = 30^\circ$

46. $(\sqrt{-2})(\sqrt{3})$ is equal to:

- (A) $\sqrt{6}$
- (B) $-\sqrt{6}$
- (C) $i\sqrt{6}$
- (D) None of these

47. What is the number of ways of arranging the letters of the word 'BANANA' so that no two N's are together?

- (A) 40
- (B) 60
- (C) 80
- (D) 100

48. If a set A has n elements, then the total number of subsets of A is:

- (A) n
- (B) n^2
- (C) 2^n
- (D) $2n$

49. If $f(x) = \frac{x}{x-1}$, then $\frac{f(a)}{f(a+1)} =$

- (A) $f(-a)$
- (B) $f\left(\frac{1}{a}\right)$
- (C) $f(a^2)$
- (D) $f\left(\frac{-a}{a-1}\right)$

50. If A be the arithmetic mean between two numbers and S be the sum of n arithmetic means between the same numbers, then:

- (A) $S = nA$
- (B) $A = nS$
- (C) $A = S$
- (D) None of these



Space for Rough Work

Space for Rough Work

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A monthly / quarterly **experiment kit for Class 4–5 students.**

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💡 Builds science confidence.

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A quarterly **journal for Class 4–5 students.**

- Submit essays, projects, or drawings.
- Selected work printed with student name.
- QR codes link to student presentations.

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Scan the QR to explore & order online

ScienceX Olympiad — Post-Exam Add-On Page

Make this page useful for reflection, family engagement, and classroom reuse.

1) Reflection & Self-Assessment

My Performance Tracker

- Questions I found **easy**:

- Questions I found **tough**:

- One concept to revise:

Confidence Rating:

- ☐ Fully confident ☐ Partly confident ☐ Guessed the answer

2) Challenge Your Parent / Friend

Pick **any 3 questions** from this paper and ask your parent/sibling/friend to solve them.

Q. No.	Solved? (Y/N)	Time Taken	Who explained better?

3) Teacher's Corner

Teachers can reuse this paper for continued learning:

- Select 5 questions for a **weekly quiz**.
- Discuss the **most missed** question in class.
- Post one “**Question of the Week**” on the noticeboard.

4) Next Steps for Students

-
- File this paper in your **ScienceX Portfolio**. Reattempt it in **2 weeks** and compare scores.
 - Submit your best written explanation (any one question) to your teacher or ScienceX.
 - Top student explanations may feature in the **ScienceX Young Innovators Journal**.