

Full Practice Exam — Set 2

Mathematics · Class 9 · Full Syllabus Practice Exam

TIME 60 minutes	QUESTIONS 50	TOTAL MARKS 60	MAX. SCORE ___ / 60
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Name: _____ Class/Sec: _____ Date: _____

INSTRUCTIONS

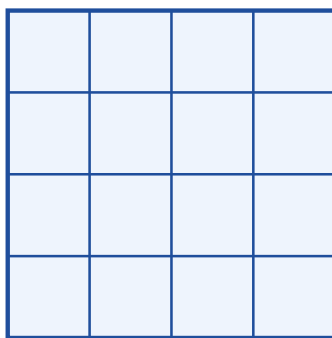
- There are **50 questions** in this paper. All questions are compulsory.
- Each question has four options (A), (B), (C) and (D). Exactly **one** option is correct.
- Questions 1–45 carry **1 mark** each. Questions 46–50 (Achievers Section) carry **3 marks** each.
- There is no negative marking. Use of a calculator is **not** allowed.
- Take $\pi = 22/7$ wherever it is needed. Rough work may be done in the space at the side of each page.

Section 1 — Logical Reasoning

Q1–Q10 · 1 mark each

- What comes next in the series? 2, 6, 12, 20, 30, ____
 (A) 36 (B) 40
 (C) 42 (D) 44
- What comes next in the series? BD, FH, JL, ____
 (A) NP (B) MO
 (C) NO (D) MP
- If PLANT is coded as QMBOU, then STONE is coded as _____.
 (A) TUPOF (B) TUPNF
 (C) TVPOF (D) TUQOF
- Find the **odd one out**: 3, 5, 7, 9
 (A) 3 (B) 5
 (C) 7 (D) 9
- Complete the analogy: 8 : 512 :: 5 : ____
 (A) 25 (B) 75
 (C) 125 (D) 225
- A boy walks 10 m east, turns right and walks 10 m, then turns right again and walks 20 m. How far is he from his starting point?
 (A) 10 m (B) 40 m
 (C) 20 m (D) $10\sqrt{2}$ m
- A is B's brother, C is A's mother and D is C's father. How is A related to D?
 (A) Grandson (B) Son
 (C) Nephew (D) Brother

8. In a class, Meera is 7th from the top and 18th from the bottom in a merit list. How many students are there in the class?
- (A) 23 (B) 24
(C) 25 (D) 26
9. If 15 August 2024 was a Thursday, what day of the week was 15 September 2024?
- (A) Friday (B) Saturday
(C) Monday (D) Sunday
10. How many squares of all sizes can be counted in the 4×4 grid below?



A 4×4 grid of unit squares

- (A) 16 (B) 24
(C) 30 (D) 36

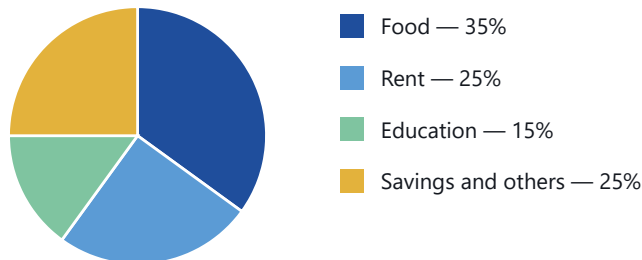
Section 2 — Mathematical Reasoning

Q11–Q28 · 1 mark each

11. The value of $\sqrt{0.09}$ is _____.
(A) 0.3 (B) 0.03
(C) 0.9 (D) 3
12. $(\sqrt{7} + \sqrt{2})^2$ equals _____.
(A) 9 (B) $9 + 2\sqrt{14}$
(C) $9 + \sqrt{14}$ (D) $5 + 2\sqrt{14}$
13. The value of $8^{-2/3}$ is _____.
(A) -4 (B) 4
(C) $\frac{1}{2}$ (D) $\frac{1}{4}$
14. The zeroes of the polynomial $x^2 - 4$ are _____.
(A) 2 and -2 (B) 2 only
(C) 2 and 4 (D) 4 and -4
15. In the product $(x - 1)(x^2 + x + 1)$, the coefficient of x^2 is _____.
(A) 1 (B) 0
(C) -1 (D) 2
16. The expansion of $(x + 2)^3$ is _____.
(A) $x^3 + 8$ (B) $x^3 + 6x^2 + 8x + 12$
(C) $x^3 + 2x^2 + 4x + 8$ (D) $x^3 + 6x^2 + 12x + 8$

17. If $x - \frac{1}{x} = 3$, then $x^2 + \frac{1}{x^2}$ equals _____.
 (A) 7 (B) 9
 (C) 11 (D) 13
18. Every point lying on the y-axis has abscissa _____.
 (A) 0 (B) 1
 (C) Equal to its ordinate (D) Always positive
19. Which of the following points lies on the line $2x - y = 5$?
 (A) (1, 3) (B) (3, 1)
 (C) (2, 1) (D) (0, 5)
20. A linear equation in two variables has _____.
 (A) Exactly one solution (B) Exactly two solutions
 (C) Infinitely many solutions (D) No solution
21. An exterior angle of a triangle measures 120° and one of the interior opposite angles is 45° . The other interior opposite angle is _____.
 (A) 60° (B) 65°
 (C) 85° (D) 75°
22. The RHS congruence criterion can be applied only to _____.
 (A) Right-angled triangles (B) Equilateral triangles
 (C) Isosceles triangles (D) Any pair of triangles
23. An arc subtends an angle of 100° at the centre of a circle. The angle it subtends at a point on the major arc is _____.
 (A) 25° (B) 50°
 (C) 100° (D) 200°
24. The diagonals of a rhombus are 6 cm and 8 cm. The length of each side is _____.
 (A) 10 cm (B) 7 cm
 (C) 5 cm (D) 14 cm
25. The area of an equilateral triangle of side 8 cm is _____.
 (A) $8\sqrt{3} \text{ cm}^2$ (B) $32\sqrt{3} \text{ cm}^2$
 (C) $64\sqrt{3} \text{ cm}^2$ (D) $16\sqrt{3} \text{ cm}^2$
26. The total surface area of a cube of edge 5 cm is _____.
 (A) 150 cm^2 (B) 100 cm^2
 (C) 125 cm^2 (D) 25 cm^2
27. The mode of the data 3, 4, 4, 5, 6, 4, 7 is _____.
 (A) 3 (B) 4
 (C) 5 (D) 7
28. A fair die is rolled once. The probability of getting an even number is _____.
 (A) $\frac{1}{6}$ (B) $\frac{1}{2}$
 (C) $\frac{1}{3}$ (D) $\frac{2}{3}$

29. A cylindrical pillar has radius 1.4 m and height 5 m. The cost of painting its curved surface at ₹20 per square metre is _____.
(A) ₹440 (B) ₹1760
(C) ₹880 (D) ₹308
30. A triangular flag has sides 26 cm, 28 cm and 30 cm. Its area is _____.
(A) 168 cm^2 (B) 84 cm^2
(C) 420 cm^2 (D) 336 cm^2
31. A hall measures $5 \text{ m} \times 4 \text{ m} \times 3 \text{ m}$. If each person needs 3 m^3 of air, how many people can the hall hold?
(A) 15 (B) 18
(C) 20 (D) 60
32. An ice-cream cone has base radius 3.5 cm and height 12 cm. The volume of ice cream it holds when filled level with the top is _____.
(A) 154 cm^3 (B) 462 cm^3
(C) 77 cm^3 (D) 132 cm^3
33. A cricket ball has radius 3.5 cm. The area of leather needed to cover it completely is _____.
(A) 38.5 cm^2 (B) 154 cm^2
(C) 77 cm^2 (D) 179.7 cm^2
34. The pie chart shows how a family of monthly income ₹36 000 spends its money. How much does it spend on food?



Monthly spending of a family with income ₹36 000

- (A) ₹9000 (B) ₹10 800
(C) ₹12 600 (D) ₹14 400
35. In a lottery there are 1000 tickets and 5 of them carry a prize. The probability that a ticket bought at random wins a prize is _____.
(A) $\frac{1}{5}$ (B) $\frac{1}{50}$
(C) $\frac{5}{100}$ (D) $\frac{1}{200}$

36. The table shows the number of hours 40 students spent reading in a week. What is the mean number of hours?

Hours	2	3	4	5
Number of students	8	12	14	6

Table 2.1 — Weekly reading hours of 40 students

- (A) 3.45 hours (B) 3.0 hours
(C) 3.5 hours (D) 4.0 hours
37. A wire is bent into a circle of radius 14 cm. If it is straightened and bent into a square instead, the side of the square is _____.
(A) 11 cm (B) 22 cm
(C) 44 cm (D) 88 cm
38. A box holds tickets numbered 1 to 20. One ticket is drawn at random. The probability that its number is a multiple of 5 is _____.
(A) $\frac{1}{20}$ (B) $\frac{1}{10}$
(C) $\frac{1}{5}$ (D) $\frac{1}{4}$
39. Two supplementary angles differ by 40° . The larger angle is _____.
(A) 70° (B) 100°
(C) 120° (D) 110°
40. A gardener fences a rectangular plot 24 m long and 18 m wide, leaving a 3 m gap for a gate. The length of fencing required is _____.
(A) 81 m (B) 84 m
(C) 87 m (D) 42 m
41. The heights (in cm) of seven plants are 32, 28, 35, 40, 28, 31 and 36. The median height is _____.
(A) 28 cm (B) 32 cm
(C) 31 cm (D) 35 cm
42. The ages of a father and his son are in the ratio 7 : 2 and their ages add up to 45 years. The son's age is _____.
(A) 9 years (B) 12 years
(C) 10 years (D) 15 years
43. A rectangular sheet of tin 44 cm by 20 cm is rolled along its length to form a cylinder of height 20 cm. The radius of the cylinder is _____.
(A) 3.5 cm (B) 22 cm
(C) 14 cm (D) 7 cm
44. A shopkeeper sells rice at ₹48 per kilogram. Taking x as the number of kilograms and y as the amount paid, the relation between x and y is _____.
(A) $y = 48x$ (B) $y = 48 + x$
(C) $x = 48y$ (D) $xy = 48$

45. A conical vessel of radius 6 cm and height 8 cm is completely filled with water. The slant height of the vessel is _____.
(A) 12 cm (B) 10 cm
(C) 14 cm (D) 48 cm

Achievers Section

Q46–Q50 · 3 marks each

46. On rationalising the denominator, $\frac{\sqrt{5} + \sqrt{3}}{\sqrt{5} - \sqrt{3}}$ equals _____.
(A) $8 + 2\sqrt{15}$ (B) $4 - \sqrt{15}$
(C) $4 + \sqrt{15}$ (D) $\frac{4 + \sqrt{15}}{2}$
47. Given that $a + b + c = 0$ implies $a^3 + b^3 + c^3 = 3abc$, the value of $(-7)^3 + 3^3 + 4^3$ is _____.
(A) 0 (B) 252
(C) -84 (D) -252
48. In parallelogram ABCD, $\angle DAB = 80^\circ$ and the bisector of $\angle A$ meets DC at E. The measure of $\angle AED$ is _____.
(A) 40° (B) 50°
(C) 80° (D) 100°
49. The radius and height of a cylinder are in the ratio 2 : 3 and its volume is $12\,936\text{ cm}^3$. The radius of the cylinder is _____.
(A) 7 cm (B) 14 cm
(C) 12 cm (D) 21 cm
50. The mean of 25 observations is 36. If the mean of the first 13 observations is 32 and that of the last 13 observations is 39, then the 13th observation is _____.
(A) 20 (B) 23
(C) 25 (D) 28

Answer Key

1	C	2	A	3	A	4	D	5	C
6	D	7	A	8	B	9	D	10	C
11	A	12	B	13	D	14	A	15	B
16	D	17	C	18	A	19	B	20	C
21	D	22	A	23	B	24	C	25	D
26	A	27	B	28	B	29	C	30	D
31	C	32	A	33	B	34	C	35	D
36	A	37	B	38	C	39	D	40	A
41	B	42	C	43	D	44	A	45	B
46	C	47	D	48	A	49	B	50	B

Solutions

1. Answer: (C) 42

Each term is $n(n + 1)$: 1×2 , 2×3 , 3×4 , 4×5 , 5×6 . The sixth term is $6 \times 7 = \mathbf{42}$. (The differences 4, 6, 8, 10, 12 give the same answer.)

2. Answer: (A) NP

Within each pair the second letter is two ahead of the first, and each pair starts four letters after the previous one: B, F, J, **N**. So the next pair is **NP**.

3. Answer: (A) TUPOF

Every letter moves one step forward in the alphabet ($P \rightarrow Q$, $L \rightarrow M$, and so on). Applying this to STONE gives $S \rightarrow T$, $T \rightarrow U$, $O \rightarrow P$, $N \rightarrow O$, $E \rightarrow F$, that is **TUPOF**.

4. Answer: (D) 9

3, 5 and 7 are prime numbers. $9 = 3 \times 3$ is composite, so it is the odd one out. (All four are odd, so oddness cannot be the distinguishing property.)

5. Answer: (C) 125

$512 = 8^3$, so the rule is $n \rightarrow n^3$. Therefore 5 gives $5^3 = \mathbf{125}$.

6. Answer: (D) $10\sqrt{2}$ m

Starting at the origin he reaches (10, 0), then turning right faces south and reaches (10, -10), then turning right faces west and reaches (-10, -10). The distance from the origin is $\sqrt{(10^2 + 10^2)} = \mathbf{10\sqrt{2} \text{ m} \approx 14.1 \text{ m}}$.

7. Answer: (A) Grandson

D is the father of C, and C is A's mother, so D is A's maternal grandfather. Hence A is D's **grandson**.

8. Answer: (B) 24

Total = (rank from top) + (rank from bottom) - 1 = $7 + 18 - 1 = \mathbf{24}$. Subtracting 1 avoids counting Meera twice.

9. Answer: (D) Sunday

August has 31 days, so 15 September is 31 days after 15 August. Since $31 = 4 \times 7 + 3$, the day advances by 3 from Thursday, landing on **Sunday**.

10. Answer: (C) 30

Count by size: sixteen 1×1 squares, nine 2×2 , four 3×3 and one 4×4 . The total is $16 + 9 + 4 + 1 = \mathbf{30}$. Counting only the smallest squares gives 16, the commonest slip.

11. Answer: (A) 0.3

Since $0.3 \times 0.3 = 0.09$, we get $\sqrt{0.09} = \mathbf{0.3}$. A useful check: the square root of a number smaller than 1 is larger than the number itself.

12. Answer: (B) $9 + 2\sqrt{14}$

Use $(a + b)^2 = a^2 + 2ab + b^2$: here $a^2 = 7$, $b^2 = 2$ and $2ab = 2\sqrt{14}$. So the value is $\mathbf{9 + 2\sqrt{14} \approx 16.48}$.

13. Answer: (D) $\frac{1}{4}$

$8 = 2^3$, so $8^{-2/3} = (2^3)^{-2/3} = 2^{-2} = \mathbf{\frac{1}{4}}$. A negative index gives a reciprocal, never a negative value.

14. Answer: (A) 2 and -2

Factorising by the difference of squares, $x^2 - 4 = (x - 2)(x + 2)$, which vanishes when $x = \mathbf{2 \text{ or } -2}$.

15. Answer: (B) 0

This is the identity $a^3 - b^3 = (a - b)(a^2 + ab + b^2)$ with $b = 1$, so the product is simply $x^3 - 1$. There is no x^2 term, so its coefficient is **0**.

16. Answer: (D) $x^3 + 6x^2 + 12x + 8$

Use $(a + b)^3 = a^3 + 3a^2b + 3ab^2 + b^3$ with $a = x$ and $b = 2$: $3a^2b = 6x^2$, $3ab^2 = 12x$ and $b^3 = 8$. So the expansion is $x^3 + 6x^2 + 12x + 8$.

17. Answer: (C) 11

Squaring, $(x - \frac{1}{x})^2 = x^2 - 2 + \frac{1}{x^2} = 9$, so $x^2 + \frac{1}{x^2} = 9 + 2 = 11$. Note the -2 here, against $+2$ when the sign inside is positive.

18. Answer: (A) 0

The abscissa measures horizontal distance from the y-axis, which is **0** for every point of that axis. Its ordinate, meanwhile, can be any real number.

19. Answer: (B) (3, 1)

Substituting **(3, 1)** gives $2(3) - 1 = 5$, which satisfies the equation. The other three give -1 , 3 and -5 .

20. Answer: (C) Infinitely many solutions

Every value chosen for one variable yields a matching value for the other, so there are **infinitely many solutions**, and together they form a straight line.

21. Answer: (D) 75°

An exterior angle equals the sum of the two interior opposite angles, so the required angle is $120^\circ - 45^\circ = 75^\circ$.

22. Answer: (A) Right-angled triangles

RHS stands for right angle–hypotenuse–side, so it applies only to **right-angled triangles**: equal hypotenuses and one pair of equal legs make them congruent.

23. Answer: (B) 50°

The angle at the centre is twice the angle at any point on the remaining part of the circle, so the required angle is $100^\circ \div 2 = 50^\circ$.

24. Answer: (C) 5 cm

The diagonals bisect each other at right angles, giving four right triangles with legs 3 cm and 4 cm. Each side is the hypotenuse: $\sqrt{9 + 16} = \sqrt{25} = 5$ cm.

25. Answer: (D) $16\sqrt{3}$ cm²

The area of an equilateral triangle of side a is $\frac{\sqrt{3}}{4}a^2$, so here it is $\frac{\sqrt{3}}{4} \times 64 = 16\sqrt{3}$ cm² ≈ 27.7 cm².

26. Answer: (A) 150 cm²

A cube has six square faces, each of area $5 \times 5 = 25$ cm². So the total surface area is $6 \times 25 = 150$ cm². (125 cm³ would be its volume.)

27. Answer: (B) 4

The mode is the most frequently occurring value. Here **4** appears three times while every other value appears once.

28. Answer: (B) $\frac{1}{2}$

The even outcomes are 2, 4 and 6 — three of the six equally likely faces — so the probability is $\frac{3}{6} = \frac{1}{2}$.

29. Answer: (C) ₹880

Curved surface area $= 2\pi rh = 2 \times \frac{22}{7} \times 1.4 \times 5 = 44$ m². The cost is $44 \times 20 = \text{₹}880$.

30. Answer: (D) 336 cm²

Here $s = (26 + 28 + 30) \div 2 = 42$ cm. By Heron's formula the area is $\sqrt{42 \times 16 \times 14 \times 12} = \sqrt{112896} = 336$ cm².

31. Answer: (C) 20

The hall's volume is $5 \times 4 \times 3 = 60$ m³, so the number of people is $60 \div 3 = 20$.

32. Answer: (A) 154 cm^3

Volume = $\frac{1}{3}\pi r^2 h = \frac{1}{3} \times \frac{22}{7} \times 3.5 \times 3.5 \times 12$. Since $\frac{22}{7} \times 3.5 = 11$, this is $\frac{1}{3} \times 11 \times 3.5 \times 12 = \mathbf{154 \text{ cm}^3}$.

33. Answer: (B) 154 cm^2

Surface area of a sphere = $4\pi r^2 = 4 \times \frac{22}{7} \times 3.5 \times 3.5 = 4 \times 11 \times 3.5 = \mathbf{154 \text{ cm}^2}$.

34. Answer: (C) ₹12 600

Food takes 35% of the income, so the amount is $\frac{35}{100} \times 36\,000 = 350 \times 36 = \mathbf{₹12\,600}$.

35. Answer: (D) $\frac{1}{200}$

The probability is (winning tickets) $\div$ (total tickets) = $\frac{5}{1000} = \frac{1}{200}$, that is 0.005.

36. Answer: (A) 3.45 hours

Total hours = $2 \times 8 + 3 \times 12 + 4 \times 14 + 5 \times 6 = 16 + 36 + 56 + 30 = 138$. With 40 students the mean is $138 \div 40 = \mathbf{3.45 \text{ hours}}$.

37. Answer: (B) 22 cm

The wire's length is the circumference $2\pi r = 2 \times \frac{22}{7} \times 14 = 88 \text{ cm}$. A square of perimeter 88 cm has side $88 \div 4 = \mathbf{22 \text{ cm}}$.

38. Answer: (C) $\frac{1}{5}$

The multiples of 5 up to 20 are 5, 10, 15 and 20 — four tickets out of 20. So the probability is $\frac{4}{20} = \frac{1}{5}$.

39. Answer: (D) 110°

Let the angles be x and $180^\circ - x$ with x the larger. Then $x - (180^\circ - x) = 40^\circ$, so $2x = 220^\circ$ and $x = \mathbf{110^\circ}$. The other angle is 70° , and $110^\circ + 70^\circ = 180^\circ$.

40. Answer: (A) 81 m

The perimeter is $2(24 + 18) = 84 \text{ m}$. Leaving a 3 m gate needs $84 - 3 = \mathbf{81 \text{ m}}$ of fencing.

41. Answer: (B) 32 cm

In order the heights are 28, 28, 31, **32**, 35, 36, 40. With seven values the median is the fourth, that is **32 cm**.

42. Answer: (C) 10 years

Let the ages be $7k$ and $2k$. Then $9k = 45$, so $k = 5$. The son is $2k = \mathbf{10 \text{ years}}$ old and the father 35 years old.

43. Answer: (D) 7 cm

Rolling along the 44 cm side makes that side the circumference, so $2 \times \frac{22}{7} \times r = 44$. Then $\frac{44}{7} r = 44$, giving $r = \mathbf{7 \text{ cm}}$, while the height stays 20 cm.

44. Answer: (A) $y = 48x$

The amount paid is the rate times the quantity, so $y = \mathbf{48x}$. This is a linear equation in two variables whose graph passes through the origin.

45. Answer: (B) 10 cm

The radius, height and slant height form a right triangle, so $l = \sqrt{r^2 + h^2} = \sqrt{36 + 64} = \sqrt{100} = \mathbf{10 \text{ cm}}$.

46. Answer: (C) $4 + \sqrt{15}$

Multiply above and below by $(\sqrt{5} + \sqrt{3})$. The denominator becomes $5 - 3 = 2$ and the numerator $(\sqrt{5} + \sqrt{3})^2 = 5 + 3 + 2\sqrt{15} = 8 + 2\sqrt{15}$. Dividing by 2 gives $\mathbf{4 + \sqrt{15} \approx 7.87}$.

47. Answer: (D) -252

Here $-7 + 3 + 4 = 0$, so the identity applies and the sum of cubes is $3 \times (-7) \times 3 \times 4 = -252$. Direct computation agrees: $-343 + 27 + 64 = -252$.

48. Answer: (A) 40°

The bisector makes $\angle DAE = 40^\circ$. Since AB is parallel to DC, $\angle AED$ and $\angle EAB$ are alternate angles, so $\angle AED = \angle EAB = 40^\circ$. (This also shows $\triangle ADE$ is isosceles with $DA = DE$.)

49. Answer: (B) 14 cm

Let $r = 2k$ and $h = 3k$. Then $\pi r^2 h = \frac{22}{7} \times 4k^2 \times 3k = \frac{264}{7} k^3 = 12\,936$, so $k^3 = 12\,936 \times \frac{7}{264} = 343$ and $k = 7$. Hence the radius is $2k = \mathbf{14\text{ cm}}$ (and the height 21 cm).

50. Answer: (B) 23

The total of all 25 observations is $25 \times 36 = 900$. The first thirteen add to $13 \times 32 = 416$ and the last thirteen to $13 \times 39 = 507$. Adding these counts the 13th observation twice, so it equals $(416 + 507) - 900 = \mathbf{23}$.