

Full Practice Exam — Set 1

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

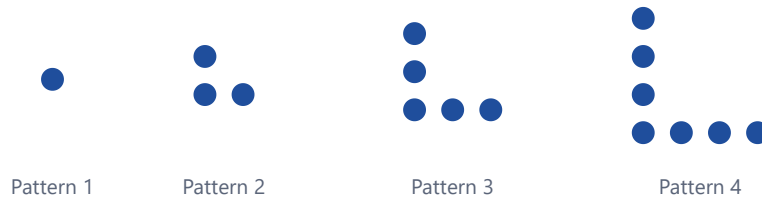
Q1–Q10 · 1 mark each

- What comes next in the series? 3, 6, 11, 18, 27, ____
 (A) 36 (B) 38
 (C) 40 (D) 42
- What comes next in the series? AZ, CX, EV, ____
 (A) GT (B) GU
 (C) FT (D) HU
- In a certain code FLOWER is written as 6-12-15-23-5-18. How is GARDEN written in the same code?
 (A) 7-1-18-5-4-14 (B) 7-1-17-4-5-14
 (C) 6-1-18-4-5-14 (D) 7-1-18-4-5-14
- Find the **odd one out**: 121, 144, 169, 200
 (A) 121 (B) 144
 (C) 169 (D) 200
- Complete the analogy: 5 : 26 :: 7 : ____
 (A) 48 (B) 49
 (C) 50 (D) 52
- A man walks 5 km north, then 3 km east, then 5 km south. How far is he from his starting point?
 (A) 3 km (B) 5 km
 (C) 8 km (D) 13 km
- A woman points to a boy and says, "He is the son of my father's only son." How is the boy related to her?
 (A) Her son (B) Her brother
 (C) Her cousin (D) Her nephew
- In a row of 40 students, Ram is 12th from the left end. What is his position from the right end?
 (A) 29th (B) 28th
 (C) 27th (D) 30th

9. What is the angle between the hour hand and the minute hand of a clock at 3:30?

- (A) 65° (B) 70°
(C) 75° (D) 90°

10. Study the growing dot pattern below. How many dots will Pattern 5 contain?



An L-shaped dot pattern growing from Pattern 1 to Pattern 4

- (A) 8 (B) 9
(C) 10 (D) 11

Section 2 — Mathematical Reasoning

Q11–Q28 · 1 mark each

11. Which of the following numbers is **irrational**?

- (A) 3.14 (B) $\frac{22}{7}$
(C) $\sqrt{36}$ (D) 0.1010010001...

12. On rationalising the denominator, $\frac{1}{\sqrt{5}-2}$ equals _____.

- (A) $\sqrt{5} + 2$ (B) $\sqrt{5} - 2$
(C) $\frac{\sqrt{5} + 2}{9}$ (D) $\frac{\sqrt{5} - 2}{9}$

13. The value of $27^{2/3}$ is _____.

- (A) 6 (B) 9
(C) 18 (D) 81

14. The degree of the polynomial $(x^2 + 1)(x^3 - 2)$ is _____.

- (A) 3 (B) 5
(C) 6 (D) 2

15. The remainder when $x^3 - 2x^2 + x + 1$ is divided by $(x - 1)$ is _____.

- (A) 0 (B) 2
(C) 1 (D) -1

16. The factorisation of $4x^2 - 12x + 9$ is _____.

- (A) $(2x - 9)(2x - 1)$ (B) $(2x + 3)^2$
(C) $(4x - 3)(x - 3)$ (D) $(2x - 3)^2$

17. If $x + y = 7$ and $xy = 12$, then $x^2 + y^2$ equals _____.

- (A) 25 (B) 37
(C) 49 (D) 61

18. The point $(-4, -7)$ lies in _____.

- (A) Quadrant III (B) Quadrant II
(C) Quadrant I (D) Quadrant IV

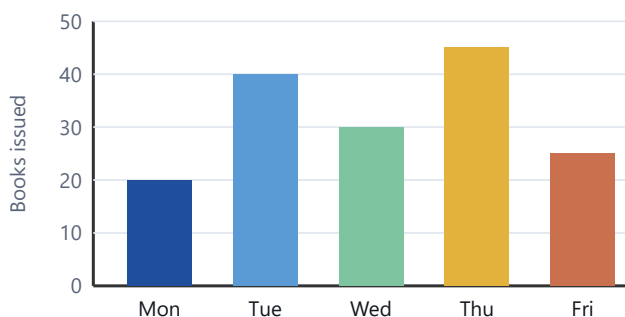
19. The equation of the y-axis is _____.
 (A) $y = 0$ (B) $x = y$
 (C) $x = 0$ (D) $y = 1$
20. If (2, 3) is a solution of $3x + ky = 12$, then $k =$ _____.
 (A) 1 (B) 2
 (C) 3 (D) 4
21. The angles of a triangle are in the ratio 3 : 4 : 5. The largest angle is _____.
 (A) 45° (B) 60°
 (C) 90° (D) 75°
22. In parallelogram ABCD, $\angle A = 65^\circ$. Then $\angle C =$ _____.
 (A) 65° (B) 115°
 (C) 125° (D) 130°
23. In a cyclic quadrilateral ABCD, $\angle B = 110^\circ$. Then $\angle D =$ _____.
 (A) 55° (B) 110°
 (C) 70° (D) 125°
24. In $\triangle ABC$, D and E are the mid-points of AB and AC. If $DE = 6$ cm, then $BC =$ _____.
 (A) 3 cm (B) 6 cm
 (C) 9 cm (D) 12 cm
25. The area of a triangle whose sides are 5 cm, 12 cm and 13 cm is _____.
 (A) 30 cm^2 (B) 60 cm^2
 (C) 36 cm^2 (D) 39 cm^2
26. The curved surface area of a cylinder of radius 7 cm and height 20 cm is _____.
 (A) 440 cm^2 (B) 1188 cm^2
 (C) 880 cm^2 (D) 3080 cm^2
27. The median of the data 4, 6, 8, 10, 12, 14 is _____.
 (A) 8 (B) 9
 (C) 10 (D) 11
28. A bag contains 5 red and 3 blue balls of the same size. One ball is drawn at random. The probability that it is blue is _____.
 (A) $\frac{3}{5}$ (B) $\frac{5}{8}$
 (C) $\frac{1}{3}$ (D) $\frac{3}{8}$

Section 3 — Everyday Mathematics

Q29–Q45 · 1 mark each

29. A cylindrical water tank has base radius 3.5 m and height 4 m. Its capacity, in litres, is _____. ($1 \text{ m}^3 = 1000$ litres)
 (A) 154 000 litres (B) 15 400 litres
 (C) 154 litres (D) 44 000 litres
30. A triangular field has sides 40 m, 50 m and 60 m. The cost of fencing it at ₹12 per metre is _____.
 (A) ₹1200 (B) ₹1500
 (C) ₹1800 (D) ₹2400

31. A rectangular park measuring 15 m by 20 m is to be levelled at ₹5 per square metre. The total cost is _____.
- (A) ₹350 (B) ₹3000
(C) ₹1750 (D) ₹1500
32. A ladder 15 m long rests against a vertical wall with its foot 9 m from the wall. The height it reaches on the wall is _____.
- (A) 12 m (B) 10 m
(C) 6 m (D) 13 m
33. The mean of the marks 12, 15, 18, 20 and 25 obtained by five students is _____.
- (A) 17 (B) 18
(C) 19 (D) 20
34. The bar graph shows the number of books issued from a school library on five days. On how many days were more than 30 books issued?



Books issued from the library from Monday to Friday

- (A) One (B) Two
(C) Three (D) Four
35. In a survey of 200 families, 80 own a car. The probability that a family chosen at random from this survey owns a car is _____.
- (A) $\frac{1}{4}$ (B) $\frac{3}{5}$
(C) $\frac{2}{5}$ (D) $\frac{4}{5}$
36. The cost of 3 pens and 2 notebooks together is ₹80. Taking the cost of a pen as ₹x and of a notebook as ₹y, the linear equation is _____.
- (A) $2x + 3y = 80$ (B) $x + y = 80$
(C) $3x - 2y = 80$ (D) $3x + 2y = 80$
37. A heap of wheat is in the shape of a cone of base radius 4.2 m and height 2.8 m. Its volume is _____.
- (A) 51.744 m^3 (B) 155.232 m^3
(C) 38.808 m^3 (D) 17.248 m^3
38. A hemispherical bowl has radius 10.5 cm. The volume of soup it can hold is _____.
- (A) 693 cm^3 (B) 2425.5 cm^3
(C) 1155 cm^3 (D) 4851 cm^3

39. The mean of the first ten natural numbers is _____.
 (A) 5 (B) 6
 (C) 5.5 (D) 10
40. A wheelchair ramp rises 1 m over a horizontal run of 12 m. If the sloping surface measures $\sqrt{145}$ m, the perimeter of the triangular side of the ramp is _____.
 (A) 13 m (B) $(12 + \sqrt{145})$ m
 (C) 24 m (D) $(13 + \sqrt{145})$ m
41. A shopkeeper stacks tins so that each layer has 4 tins more than the one above it. If the top layer has 6 tins, how many tins are in the fifth layer from the top?
 (A) 18 (B) 22
 (C) 26 (D) 30
42. A cubical tank of edge 1.5 m is filled to the brim with water. The volume of water it holds is _____.
 (A) 3.375 m^3 (B) 2.25 m^3
 (C) 4.5 m^3 (D) 6.75 m^3
43. The marks of nine students are 45, 52, 60, 38, 71, 55, 49, 66 and 58. The median mark is _____.
 (A) 52 (B) 55
 (C) 58 (D) 60
44. A field is in the shape of a rhombus whose diagonals measure 24 m and 10 m. Its area is _____.
 (A) 60 m^2 (B) 120 m^2
 (C) 240 m^2 (D) 34 m^2
45. A spinner is divided into 8 equal sectors numbered 1 to 8. The probability that a single spin lands on a number that is a multiple of 3 is _____.
 (A) $\frac{1}{8}$ (B) $\frac{3}{8}$
 (C) $\frac{1}{4}$ (D) $\frac{1}{2}$

Achievers Section

Q46–Q50 · 3 marks each

46. If $x = 3 + 2\sqrt{2}$, then $x + \frac{1}{x}$ equals _____.
 (A) $6 + 4\sqrt{2}$ (B) $4\sqrt{2}$
 (C) 3 (D) 6
47. If both $(x - 1)$ and $(x - 2)$ are factors of $x^3 + ax^2 + bx - 2$, then the values of a and b are _____.
 (A) $a = -4, b = 5$ (B) $a = 4, b = -5$
 (C) $a = -4, b = -5$ (D) $a = -5, b = 4$
48. In $\triangle ABC$, $\angle A = 60^\circ$ and the bisectors of $\angle B$ and $\angle C$ meet at O. The measure of $\angle BOC$ is _____.
 (A) 100° (B) 120°
 (C) 110° (D) 130°
49. A solid metal sphere of radius 6 cm is melted and recast into small cones, each of base radius 2 cm and height 3 cm. The number of cones formed is _____.
 (A) 18 (B) 24
 (C) 36 (D) 72

50. Consider the three statements below.

- (i) Every rational number is a real number.
- (ii) A triangle can have two obtuse angles.
- (iii) The diagonals of a rectangle bisect each other.

Which of them are **true**?

(A) (i) and (ii) only

(C) (i) and (iii) only

(B) (ii) and (iii) only

(D) All three

Answer Key

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

Solutions

1. Answer: (B) 38

The differences are 3, 5, 7, 9 — consecutive odd numbers. The next difference is 11, so the next term is $27 + 11 = 38$.

2. Answer: (A) GT

The first letters move forward two steps at a time: A, C, E, **G**. The second letters move backward two steps: Z, X, V, **T**. So the next pair is **GT**.

3. Answer: (D) 7-1-18-4-5-14

Each letter is replaced by its position in the alphabet. G=7, A=1, R=18, D=4, E=5, N=14, giving **7-1-18-4-5-14**.

4. Answer: (D) 200

$121 = 11^2$, $144 = 12^2$ and $169 = 13^2$ are perfect squares. **200** is not ($14^2 = 196$ and $15^2 = 225$), so it is the odd one out.

5. Answer: (C) 50

The rule is $n \rightarrow n^2 + 1$, since $5^2 + 1 = 26$. Applying it to 7 gives $49 + 1 = 50$.

6. Answer: (A) 3 km

The 5 km north and the 5 km south cancel exactly, leaving only the 3 km walked east. So he ends up **3 km** from where he started, due east of it.

7. Answer: (D) Her nephew

Her father's only son is her brother. The boy is that brother's son, which makes him her **nephew**.

8. Answer: (A) 29th

Position from the right = total – position from the left + 1 = $40 - 12 + 1 = 29$ **th**. The +1 is needed because Ram himself is counted from both ends.

9. Answer: (C) 75°

At 3:30 the minute hand points at 6, that is 180° from 12. The hour hand has moved half way from 3 to 4, so it is at $3.5 \times 30^\circ = 105^\circ$. The angle between them is $180^\circ - 105^\circ = 75^\circ$.

10. Answer: (B) 9

The patterns contain 1, 3, 5 and 7 dots — each L gains two dots, one on each arm. So the counts are the odd numbers, and Pattern 5 has $7 + 2 = 9$ dots (the n -th pattern has $2n - 1$).

11. Answer: (D) 0.1010010001...

3.14 terminates and $\frac{22}{7}$ repeats, so both are rational, and $\sqrt{36} = 6$. But **0.1010010001...** never terminates and never settles into a repeating block (the runs of zeros keep growing), so it is irrational.

12. Answer: (A) $\sqrt{5} + 2$

Multiply above and below by the conjugate ($\sqrt{5} + 2$). The denominator becomes $(\sqrt{5})^2 - 2^2 = 5 - 4 = 1$, so the value is simply **$\sqrt{5} + 2 \approx 4.24$** . Check: $\sqrt{5} - 2 \approx 0.236$ and $1 \div 0.236 \approx 4.24$.

13. Answer: (B) 9

$27 = 3^3$, so $27^{2/3} = (3^3)^{2/3} = 3^2 = 9$. Equivalently, take the cube root first (3) and then square it.

14. Answer: (B) 5

The degree of a product is the sum of the degrees, so $2 + 3 = 5$. Expanding gives $x^5 - 2x^2 + x^3 - 2$, whose highest power is indeed 5.

15. Answer: (C) 1

By the Remainder Theorem the remainder is $p(1) = 1 - 2 + 1 + 1 = 1$. Since it is not zero, $(x - 1)$ is not a factor.

16. Answer: (D) $(2x - 3)^2$

Recognise the pattern $a^2 - 2ab + b^2$ with $a = 2x$ and $b = 3$: $a^2 = 4x^2$, $b^2 = 9$ and $2ab = 12x$. So the expression is **$(2x - 3)^2$** , a perfect square.

17. Answer: (A) 25

Use $(x + y)^2 = x^2 + y^2 + 2xy$, so $49 = x^2 + y^2 + 24$, giving $x^2 + y^2 = 25$. (The two numbers are 3 and 4, and $9 + 16 = 25$.)

18. Answer: (A) Quadrant III

Both coordinates are negative, which places the point to the left of the y-axis and below the x-axis — that is **Quadrant III**.

19. Answer: (C) $x = 0$

Every point on the y-axis has abscissa 0, and no other point does, so the y-axis is the graph of **$x = 0$** .

20. Answer: (B) 2

Substituting: $3(2) + 3k = 12$, so $6 + 3k = 12$, $3k = 6$ and $k = 2$.

21. Answer: (D) 75°

Let the angles be $3x$, $4x$ and $5x$. Then $12x = 180^\circ$, so $x = 15^\circ$ and the angles are 45° , 60° and **75°** .

22. Answer: (A) 65°

Opposite angles of a parallelogram are equal, so $\angle C = \angle A = 65^\circ$. (115° would be $\angle B$ or $\angle D$, which are supplementary to $\angle A$.)

23. Answer: (C) 70°

Opposite angles of a cyclic quadrilateral are supplementary, so $\angle D = 180^\circ - 110^\circ = 70^\circ$.

24. Answer: (D) 12 cm

By the Mid-point Theorem DE is half of BC, so $BC = 2 \times 6 = 12$ cm.

25. Answer: (A) 30 cm^2

Here $s = (5 + 12 + 13) \div 2 = 15$, so the area is $\sqrt{(15 \times 10 \times 3 \times 2)} = \sqrt{900} = 30 \text{ cm}^2$. Since $5^2 + 12^2 = 13^2$, the triangle is right-angled and $\frac{1}{2} \times 5 \times 12 = 30 \text{ cm}^2$ confirms this.

26. Answer: (C) 880 cm^2

Curved surface area $= 2\pi rh = 2 \times \frac{22}{7} \times 7 \times 20$. The 7 cancels the denominator, leaving $2 \times 22 \times 20 = 880 \text{ cm}^2$.

27. Answer: (B) 9

The data is already in order and has six values, an even count, so the median is the mean of the third and fourth values: $(8 + 10) \div 2 = 9$.

28. Answer: (D) $\frac{3}{8}$

There are $5 + 3 = 8$ equally likely balls, of which 3 are blue, so the probability is $\frac{3}{8}$.

29. Answer: (A) 154 000 litres

Volume $= \pi r^2 h = \frac{22}{7} \times 3.5 \times 3.5 \times 4 = 154 \text{ m}^3$. Converting, $154 \times 1000 = 154\,000$ litres.

30. Answer: (C) ₹1800

Fencing runs along the perimeter: $40 + 50 + 60 = 150$ m. At ₹12 per metre the cost is $150 \times 12 = ₹1800$.

31. Answer: (D) ₹1500

Area $= 15 \times 20 = 300 \text{ m}^2$, so the cost is $300 \times 5 = ₹1500$. Multiplying by the perimeter instead of the area is the usual mistake here.

32. Answer: (A) 12 m

The wall, ground and ladder form a right triangle, so the height is $\sqrt{(15^2 - 9^2)} = \sqrt{(225 - 81)} = \sqrt{144} = 12$ m.

33. Answer: (B) 18

The total is $12 + 15 + 18 + 20 + 25 = 90$, so the mean is $90 \div 5 = 18$.

34. Answer: (B) Two

Reading the bars against the scale: Monday 20, Tuesday 40, Wednesday 30, Thursday 45 and Friday 25. Only Tuesday and Thursday rise *above* the 30 line, so the answer is **two** days — Wednesday is exactly 30, not more.

35. Answer: (C) $\frac{2}{5}$

The empirical probability is (families owning a car) $\div$ (families surveyed) = $\frac{80}{200} = \frac{2}{5}$, or 0.4.

36. Answer: (D) $3x + 2y = 80$

Three pens cost $3x$ and two notebooks cost $2y$, and together they come to ₹80. So the equation is **$3x + 2y = 80$** .

37. Answer: (A) 51.744 m³

Volume = $\frac{1}{3} \pi r^2 h = \frac{1}{3} \times \frac{22}{7} \times 4.2 \times 4.2 \times 2.8$. Now $\frac{22}{7} \times 4.2 = 13.2$, so the product is $\frac{1}{3} \times 13.2 \times 4.2 \times 2.8 = \frac{1}{3} \times 155.232 = \mathbf{51.744 \text{ m}^3}$.

38. Answer: (B) 2425.5 cm³

A hemisphere has volume $\frac{2}{3} \pi r^3 = \frac{2}{3} \times \frac{22}{7} \times 10.5 \times 10.5 \times 10.5$. Since $\frac{22}{7} \times 10.5 = 33$, this is $\frac{2}{3} \times 33 \times 110.25 = 22 \times 110.25 = \mathbf{2425.5 \text{ cm}^3}$.

39. Answer: (C) 5.5

The numbers 1 to 10 add to $\frac{10 \times 11}{2} = 55$, so the mean is $55 \div 10 = \mathbf{5.5}$. The mean of a run of consecutive numbers need not itself be one of them.

40. Answer: (D) $(13 + \sqrt{145})$ m

The triangular side has the three edges 1 m (rise), 12 m (run) and $\sqrt{145}$ m (slope), so its perimeter is $1 + 12 + \sqrt{145} = \mathbf{(13 + \sqrt{145}) \text{ m}} \approx 25.04$ m. Note $\sqrt{145}$ cannot be simplified, since $145 = 5 \times 29$ has no square factor.

41. Answer: (B) 22

The layers hold 6, 10, 14, 18 and 22 tins. The fifth layer therefore has **22** tins, since it is 4 more than the fourth layer's 18.

42. Answer: (A) 3.375 m³

The volume of a cube is (edge)³ = $1.5 \times 1.5 \times 1.5 = \mathbf{3.375 \text{ m}^3}$, that is 3375 litres. (2.25 m² is the area of one face, not a volume.)

43. Answer: (B) 55

Arranged in order the marks are 38, 45, 49, 52, **55**, 58, 60, 66, 71. With nine values the median is the fifth one, which is **55**.

44. Answer: (B) 120 m²

The area of a rhombus is half the product of its diagonals: $\frac{1}{2} \times 24 \times 10 = \mathbf{120 \text{ m}^2}$.

45. Answer: (C) $\frac{1}{4}$

The multiples of 3 among 1 to 8 are 3 and 6 — two of the eight equally likely sectors. So the probability is $\frac{2}{8} = \frac{1}{4}$.

46. Answer: (D) 6

Since $(3 + 2\sqrt{2})(3 - 2\sqrt{2}) = 9 - 8 = 1$, the reciprocal of x is exactly $3 - 2\sqrt{2}$. Adding, $x + \frac{1}{x} = (3 + 2\sqrt{2}) + (3 - 2\sqrt{2}) = \mathbf{6}$.

47. Answer: (A) $a = -4$, $b = 5$

Apply the Factor Theorem twice. $p(1) = 1 + a + b - 2 = 0$ gives $a + b = 1$. $p(2) = 8 + 4a + 2b - 2 = 0$ gives $4a + 2b = -6$, that is $2a + b = -3$. Subtracting the first relation from the second eliminates b and leaves $a = -4$, so $b = 1 - (-4) = 5$. Hence **$a = -4$ and $b = 5$** , and the polynomial $x^3 - 4x^2 + 5x - 2$ does vanish at both $x = 1$ and $x = 2$.

48. Answer: (B) 120°

$\angle B + \angle C = 180^\circ - 60^\circ = 120^\circ$, so the two half-angles add to 60° . In $\triangle BOC$ the angle sum gives $\angle BOC = 180^\circ - 60^\circ = 120^\circ$, matching the general result $\angle BOC = 90^\circ + \frac{\angle A}{2}$.

49. Answer: (C) 36

The sphere's volume is $\frac{4}{3}\pi \times 6^3 = 288\pi \text{ cm}^3$, and each cone holds $\frac{1}{3}\pi \times 2^2 \times 3 = 4\pi \text{ cm}^3$. Since melting conserves volume, the number of cones is $288\pi \div 4\pi = 36$.

50. Answer: (C) (i) and (iii) only

Statement (i) is true, since the reals contain both the rationals and the irrationals. Statement (ii) is false: two angles above 90° would already exceed the 180° total. Statement (iii) is true, because a rectangle is a parallelogram and the diagonals of any parallelogram bisect each other. So **(i) and (iii)** hold.