

Full Practice Exam — Set 3

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? 5, 11, 23, 47, ____
 (A) 71 (B) 83
 (C) 94 (D) 95
- What comes next in the series? ZY, WV, TS, ____
 (A) RQ (B) QP
 (C) SR (D) PO
- In a certain code TEACHER is written as REHCAET. How is STUDENT written in that code?
 (A) TNEDUTS (B) TNDEUTS
 (C) SNEDUTT (D) TNEUDTS
- Find the **odd one out**: 64, 125, 196, 343
 (A) 64 (B) 125
 (C) 196 (D) 343
- Complete the analogy: 12 : 144 :: 15 : ____
 (A) 180 (B) 215
 (C) 225 (D) 255
- A girl facing north turns 90° clockwise, then 90° clockwise again, and finally 180°. Which direction is she facing now?
 (A) East (B) North
 (C) South (D) West
- Ravi says, "This girl is the wife of the grandson of my mother." How is the girl related to Ravi?
 (A) Sister (B) Daughter
 (C) Niece (D) Daughter-in-law

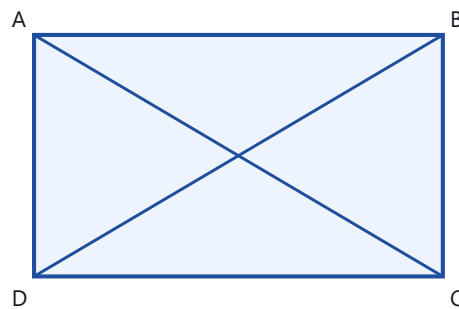
8. In a queue, A is 5th from the front and B is 6th from the back. If there are exactly 3 people standing between A and B, how many people are in the queue?

- (A) 11 (B) 13
(C) 14 (D) 15

9. If $2 * 3 = 13$ and $3 * 4 = 25$, then $4 * 5 = \underline{\hspace{2cm}}$

- (A) 29 (B) 36
(C) 41 (D) 45

10. How many triangles are there in the figure below?



Rectangle ABCD with both diagonals drawn

- (A) 4 (B) 6
(C) 8 (D) 10

Section 2 — Mathematical Reasoning

Q11–Q28 · 1 mark each

11. In simplest surd form, $\sqrt{45}$ equals _____.

- (A) $3\sqrt{5}$ (B) $5\sqrt{3}$
(C) $9\sqrt{5}$ (D) 15

12. The decimal expansion of $\frac{7}{8}$ _____.

- (A) Terminates after 2 decimal places (B) Terminates after 3 decimal places
(C) Repeats with a block of 3 digits (D) Never terminates

13. The value of $5^{1/2} \times 5^{3/2}$ is _____.

- (A) 5 (B) $\sqrt{5}$
(C) 125 (D) 25

14. If $p(x) = 2x^2 - 3x + 1$, then $p(-1) = \underline{\hspace{2cm}}$.

- (A) 0 (B) 2
(C) 4 (D) 6

15. If $(x + 1)$ is a factor of $x^3 + 3x^2 + kx + 2$, then $k = \underline{\hspace{2cm}}$.

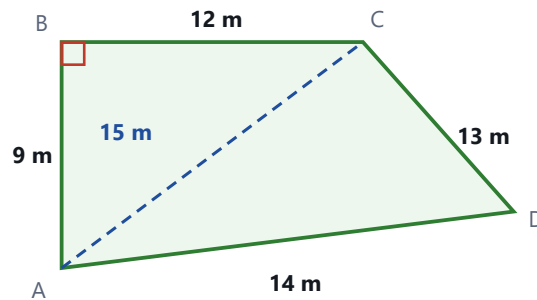
- (A) 2 (B) 3
(C) 4 (D) 6

16. The factorisation of $x^2 - 9y^2$ is _____.

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

17. The expression $(a + b)^2 - (a - b)^2$ simplifies to _____.
(A) $2ab$ (B) $4ab$
(C) $2a^2 + 2b^2$ (D) 0
18. The coordinates of the origin are _____.
(A) (0, 1) (B) (1, 0)
(C) (1, 1) (D) (0, 0)
19. The point (5, 0) lies _____.
(A) On the x-axis (B) On the y-axis
(C) In Quadrant I (D) In Quadrant IV
20. Which of the following points lies on the line $y = x$?
(A) (2, -2) (B) (2, 2)
(C) (0, 2) (D) (2, 0)
21. Two angles of a triangle are equal and the third is 80° . Each of the equal angles measures _____.
(A) 40° (B) 80°
(C) 60° (D) 50°
22. The angles of a triangle are x , $(x + 10)^\circ$ and $(x + 20)^\circ$. The largest angle is _____.
(A) 70° (B) 60°
(C) 50° (D) 80°
23. Equal chords of a circle subtend _____ at the centre.
(A) Supplementary angles (B) Equal angles
(C) Right angles (D) Angles in the ratio 1 : 2
24. The diagonals of a square are _____.
(A) Equal but not perpendicular (B) Perpendicular but not equal
(C) Equal and perpendicular (D) Neither equal nor perpendicular
25. The area of a triangle with sides 9 cm, 12 cm and 15 cm is _____.
(A) 45 cm^2 (B) 60 cm^2
(C) 108 cm^2 (D) 54 cm^2
26. The volume of a cube of edge 4 cm is _____.
(A) 64 cm^3 (B) 48 cm^3
(C) 16 cm^3 (D) 96 cm^3
27. The mean of five numbers is 20. The sum of those numbers is _____.
(A) 25 (B) 80
(C) 100 (D) 120
28. The probability of an event that is certain to happen is _____.
(A) 0 (B) 1
(C) $\frac{1}{2}$ (D) Greater than 1

29. A park is shaped like quadrilateral ABCD, in which $\angle B = 90^\circ$, $AB = 9$ m, $BC = 12$ m, $CD = 13$ m and $DA = 14$ m. Its area is _____.



Park ABCD with a right angle at B and diagonal AC drawn

- (A) 84 m^2 (B) 108 m^2
 (C) 150 m^2 (D) 138 m^2
30. A cylindrical drum of radius 7 cm and height 30 cm is filled with oil. The volume of oil, in litres, is _____.
 ($1000 \text{ cm}^3 = 1 \text{ litre}$)
 (A) 4.62 litres (B) 4.62×10^3 litres
 (C) 46.2 litres (D) 0.462 litres
31. A birthday cap is a hollow cone of base radius 7 cm and slant height 25 cm. The area of paper needed to make it is _____.
 (A) 154 cm^2 (B) 550 cm^2
 (C) 396 cm^2 (D) 704 cm^2
32. A spherical balloon has radius 21 cm. Its volume is _____.
 (A) 5544 cm^3 (B) 9702 cm^3
 (C) 1386 cm^3 (D) $38\,808 \text{ cm}^3$
33. The table shows how 50 families rated a new bus service. What is the probability that a family picked at random rated it "Good"?

Rating	Excellent	Good	Average	Poor
Number of families	12	18	14	6

Table 3.1 — Ratings given by 50 families

- (A) $\frac{9}{25}$ (B) $\frac{6}{25}$
 (C) $\frac{7}{25}$ (D) $\frac{3}{25}$
34. The mean of six numbers is 12. Five of them are 10, 11, 13, 14 and 15. The sixth number is _____.
 (A) 9 (B) 10
 (C) 11 (D) 12

35. A floor measuring 6 m by 4.5 m is to be covered with square tiles of side 30 cm. The number of tiles needed is _____.
 (A) 90 (B) 150
 (C) 300 (D) 450
36. A semicircular protractor has radius 7 cm. Its perimeter, including the straight edge, is _____.
 (A) 22 cm (B) 36 cm
 (C) 29 cm (D) 44 cm
37. Two complementary angles are in the ratio 2 : 3. The smaller angle is _____.
 (A) 30° (B) 54°
 (C) 45° (D) 36°
38. A cuboidal water tank measures 2 m $\times$ 1.5 m $\times$ 1 m. Its capacity in litres is _____.
 (A) 3000 litres (B) 1500 litres
 (C) 300 litres (D) 30 000 litres
39. One card is drawn at random from a well-shuffled pack of 52 playing cards. The probability that it is a red card is _____.
 (A) $\frac{1}{4}$ (B) $\frac{1}{2}$
 (C) $\frac{1}{13}$ (D) $\frac{3}{4}$
40. A gardener plants saplings along the boundary of a square field of side 45 m, one every 3 m including one at each corner. The number of saplings needed is _____.
 (A) 15 (B) 45
 (C) 60 (D) 61
41. The cost of 5 kg of sugar and 3 kg of rice is ₹410. Taking the price of sugar as ₹x per kg and rice as ₹y per kg, the linear equation is _____.
 (A) $3x + 5y = 410$ (B) $x + y = 410$
 (C) $5x - 3y = 410$ (D) $5x + 3y = 410$
42. The daily wages (in ₹) of eight workers are 300, 320, 280, 350, 400, 320, 310 and 360. The median wage is _____.
 (A) ₹320 (B) ₹315
 (C) ₹325 (D) ₹330
43. A room is 8 m long, 6 m wide and 4 m high. The cost of whitewashing its four walls at ₹15 per square metre is _____.
 (A) ₹1800 (B) ₹1680
 (C) ₹2100 (D) ₹2400
44. In a school of 800 students, 60% travel by bus. The number of students who do **not** travel by bus is _____.
 (A) 240 (B) 320
 (C) 480 (D) 540
45. A closed cylindrical tin has radius 7 cm and height 10 cm. Its total surface area is _____.
 (A) 440 cm^2 (B) 880 cm^2
 (C) 748 cm^2 (D) 1540 cm^2

46. Taking $\sqrt{2} = 1.414$ and $\sqrt{3} = 1.732$, the value of $\frac{1}{\sqrt{3} - \sqrt{2}}$ is _____.
 (A) 0.318 (B) 0.634
 (C) 1.732 (D) 3.146
47. Which of the following is a factor of $x^3 - 3x^2 + 4x - 4$?
 (A) $x - 2$ (B) $x + 1$
 (C) $x - 1$ (D) $x + 2$
48. In a circle of radius 5 cm, two parallel chords of lengths 6 cm and 8 cm lie on opposite sides of the centre. The distance between the chords is _____.
 (A) 1 cm (B) 7 cm
 (C) 5 cm (D) 3 cm
49. A cylindrical vessel of radius 6 cm and height 15 cm is full of water. The water is poured into small conical cups of base radius 2 cm and height 3 cm. The number of cups that can be filled is _____.
 (A) 45 (B) 90
 (C) 135 (D) 270
50. Consider the three statements below.
 (i) The probability of any event lies between 0 and 1, both included.
 (ii) A quadrilateral whose diagonals bisect each other must be a parallelogram.
 (iii) The mean of a set of observations is always one of the observations.
 Which of them are **true**?
 (A) (i) and (ii) only (B) (ii) and (iii) only
 (C) (i) and (iii) only (D) All three

Answer Key

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

Solutions

1. Answer: (D) 95

Each term is double the previous one plus 1: $5 \times 2 + 1 = 11$, $11 \times 2 + 1 = 23$, $23 \times 2 + 1 = 47$. So the next term is $47 \times 2 + 1 = 95$.

2. Answer: (B) QP

The first letters go back three steps each time: Z, W, T, **Q**. The second letter is always the one just before it: **P**. So the next pair is **QP**.

3. Answer: (A) TNEDUTS

The code simply reverses the order of the letters. Reversing STUDENT gives **TNEDUTS**.

4. Answer: (C) 196

$64 = 4^3$, $125 = 5^3$ and $343 = 7^3$ are perfect cubes. **196** $= 14^2$ is a perfect square but not a cube, so it is the odd one out.

5. Answer: (C) 225

$144 = 12^2$, so the rule is $n \rightarrow n^2$. Hence 15 gives $15^2 = 225$.

6. Answer: (B) North

The first turn takes her from north to east, the second from east to south, and the final 180° turn takes her from south back to **north**. The three turns add to 360° , a complete revolution.

7. Answer: (D) Daughter-in-law

The grandson of Ravi's mother is Ravi's own son (his mother's son's son). The wife of Ravi's son is his **daughter-in-law**.

8. Answer: (C) 14

Counting from the front: 5 people up to and including A, then the 3 people between them, then B and the 5 behind B, that is 6 more. The total is $5 + 3 + 6 = 14$.

9. Answer: (C) 41

The operation adds the squares: $2^2 + 3^2 = 13$ and $3^2 + 4^2 = 25$. So $4 * 5 = 16 + 25 = 41$.

10. Answer: (C) 8

The diagonals cut the rectangle into 4 small triangles. Each diagonal also splits the rectangle into 2 large triangles, giving 4 more. The total is $4 + 4 = 8$ triangles.

11. Answer: (A) $3\sqrt{5}$

$45 = 9 \times 5$, and 9 is a perfect square, so $\sqrt{45} = \sqrt{9} \times \sqrt{5} = 3\sqrt{5} \approx 6.7$.

12. Answer: (B) Terminates after 3 decimal places

The denominator $8 = 2^3$ contains only the prime 2, so the expansion terminates, and the index 3 tells us it takes three places: $\frac{7}{8} = 0.875$. So it **terminates after 3 decimal places**.

13. Answer: (D) 25

Add the indices: $\frac{1}{2} + \frac{3}{2} = 2$, so the product is $5^2 = 25$.

14. Answer: (D) 6

Substitute $x = -1$: $p(-1) = 2(-1)^2 - 3(-1) + 1 = 2 + 3 + 1 = 6$. Note that -3×-1 is $+3$, the step most often slipped.

15. Answer: (C) 4

By the Factor Theorem $p(-1) = 0$, so $-1 + 3 - k + 2 = 0$. That is $4 - k = 0$, giving $k = 4$.

16. Answer: (A) $(x - 3y)(x + 3y)$

Both terms are squares: x^2 and $(3y)^2$. By $a^2 - b^2 = (a - b)(a + b)$, the factorisation is **$(x - 3y)(x + 3y)$** .

17. Answer: (B) $4ab$

Expanding, $(a^2 + 2ab + b^2) - (a^2 - 2ab + b^2)$ leaves $2ab + 2ab = 4ab$, since the squared terms cancel.

18. Answer: (D) (0, 0)

The origin is the point where the two axes cross, so both its coordinates are zero: **(0, 0)**.

19. Answer: (A) On the x-axis

Its ordinate is 0, so the point sits **on the x-axis**, five units to the right of the origin.

20. Answer: (B) (2, 2)

The line $y = x$ contains exactly the points whose two coordinates are equal, so **(2, 2)** lies on it. The origin does too, but (0, 2) and (2, 0) do not.

21. Answer: (D) 50°

The two equal angles add to $180^\circ - 80^\circ = 100^\circ$, so each one is $100^\circ \div 2 = \mathbf{50^\circ}$.

22. Answer: (A) 70°

The angle sum gives $3x + 30^\circ = 180^\circ$, so $x = 50^\circ$. The angles are 50° , 60° and **70°** .

23. Answer: (B) Equal angles

Joining the ends of two equal chords to the centre gives two triangles congruent by SSS (two radii and the chord), so the chords subtend **equal angles** at the centre.

24. Answer: (C) Equal and perpendicular

A square is both a rectangle and a rhombus, so it inherits equal diagonals from the rectangle and perpendicular diagonals from the rhombus: they are **equal and perpendicular** (and they bisect each other).

25. Answer: (D) 54 cm^2

Here $s = (9 + 12 + 15) \div 2 = 18$, so the area is $\sqrt{(18 \times 9 \times 6 \times 3)} = \sqrt{2916} = \mathbf{54 \text{ cm}^2}$. Since $9^2 + 12^2 = 15^2$, the triangle is right-angled and $\frac{1}{2} \times 9 \times 12 = 54 \text{ cm}^2$ agrees.

26. Answer: (A) 64 cm^3

Volume of a cube = (edge) $^3 = 4 \times 4 \times 4 = \mathbf{64 \text{ cm}^3}$. (96 cm^2 would be its total surface area.)

27. Answer: (C) 100

Since mean = sum $\div$ count, the sum is mean $\times$ count = $20 \times 5 = \mathbf{100}$.

28. Answer: (B) 1

A certain event occurs in every trial, so its probability is **1**. No probability can ever exceed 1.

29. Answer: (D) 138 m^2

Split the park along AC. In right $\triangle ABC$ the area is $\frac{1}{2} \times 9 \times 12 = 54 \text{ m}^2$, and $AC = \sqrt{(81 + 144)} = 15 \text{ m}$. For $\triangle ACD$ with sides 15, 13 and 14, $s = 21$ and Heron's formula gives $\sqrt{(21 \times 6 \times 8 \times 7)} = 84 \text{ m}^2$. The total is $54 + 84 = \mathbf{138 \text{ m}^2}$.

30. Answer: (A) 4.62 litres

Volume = $\pi r^2 h = \frac{22}{7} \times 7 \times 7 \times 30 = 4620 \text{ cm}^3$. Dividing by 1000 gives **4.62 litres**.

31. Answer: (B) 550 cm^2

A cap has no base, so only the curved surface is needed: $\pi r l = \frac{22}{7} \times 7 \times 25 = \mathbf{550 \text{ cm}^2}$.

32. Answer: (D) $38\,808 \text{ cm}^3$

Volume = $\frac{4}{3} \pi r^3 = \frac{4}{3} \times \frac{22}{7} \times 21 \times 21 \times 21$. Since $\frac{22}{7} \times 21 = 66$, this is $\frac{4}{3} \times 66 \times 441 = 88 \times 441 = \mathbf{38\,808 \text{ cm}^3}$.

33. Answer: (A) $\frac{9}{25}$

18 of the 50 families rated the service "Good", so the probability is $\frac{18}{50} = \frac{9}{25}$, that is 0.36. The four frequencies do add to 50, as they must.

34. Answer: (A) 9

The six numbers total $6 \times 12 = 72$. The five given ones add to 63, so the sixth is $72 - 63 = 9$.

35. Answer: (C) 300

The floor is 600 cm by 450 cm, taking $600 \div 30 = 20$ tiles along one side and $450 \div 30 = 15$ along the other. So $20 \times 15 = 300$ tiles are needed.

36. Answer: (B) 36 cm

The curved edge is half the circumference: $\pi r = \frac{22}{7} \times 7 = 22$ cm. Adding the straight edge, which is the diameter 14 cm, gives $22 + 14 = 36$ cm.

37. Answer: (D) 36°

Complementary angles add to 90° , so $2k + 3k = 90^\circ$, giving $k = 18^\circ$. The angles are 36° and 54° .

38. Answer: (A) 3000 litres

Volume = $2 \times 1.5 \times 1 = 3 \text{ m}^3$. Since $1 \text{ m}^3 = 1000$ litres, the capacity is **3000 litres**.

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

A pack has 26 red cards (hearts and diamonds) out of 52, so the probability is $\frac{26}{52} = \frac{1}{2}$.

40. Answer: (C) 60

The perimeter is $4 \times 45 = 180$ m. Because the boundary is a closed loop, the number of equally spaced points equals the number of gaps: $180 \div 3 = 60$ saplings.

41. Answer: (D) $5x + 3y = 410$

Five kilograms of sugar cost $5x$ and three of rice cost $3y$, and together they come to ₹410, giving **$5x + 3y = 410$** .

42. Answer: (A) ₹320

In order the wages are 280, 300, 310, 320, 320, 350, 360, 400. With eight values the median is the mean of the fourth and fifth: $(320 + 320) \div 2 = \text{₹}320$.

43. Answer: (B) ₹1680

The area of the four walls is $2(l + b)h = 2 \times (8 + 6) \times 4 = 112 \text{ m}^2$. At ₹15 per square metre the cost is $112 \times 15 = \text{₹}1680$.

44. Answer: (B) 320

Those not travelling by bus form $100\% - 60\% = 40\%$ of the school, that is $\frac{40}{100} \times 800 = 320$ students.

45. Answer: (C) 748 cm^2

Total surface area = $2\pi r(r + h) = 2 \times \frac{22}{7} \times 7 \times (7 + 10) = 44 \times 17 = 748 \text{ cm}^2$. Leaving out the two circular ends would give only 440 cm^2 .

46. Answer: (D) 3.146

Rationalise by multiplying above and below by $(\sqrt{3} + \sqrt{2})$. The denominator becomes $3 - 2 = 1$, so the value is $\sqrt{3} + \sqrt{2} = 1.732 + 1.414 = 3.146$.

47. Answer: (A) $x - 2$

Test the candidates by the Factor Theorem. $p(1) = 1 - 3 + 4 - 4 = -2$, $p(-1) = -1 - 3 - 4 - 4 = -12$, $p(-2) = -8 - 12 - 8 - 4 = -32$, but $p(2) = 8 - 12 + 8 - 4 = 0$. So **$x - 2$** is the factor.

48. Answer: (B) 7 cm

The perpendicular from the centre bisects each chord. For the 6 cm chord the half-length is 3 cm, so its distance from the centre is $\sqrt{(25 - 9)} = 4$ cm. For the 8 cm chord the half-length is 4 cm, giving $\sqrt{(25 - 16)} = 3$ cm. Being on opposite sides, the distances add: $4 + 3 = 7$ cm.

49. Answer: (C) 135

The cylinder holds $\pi \times 36 \times 15 = 540\pi \text{ cm}^3$, and each cup holds $\frac{1}{3} \pi \times 4 \times 3 = 4\pi \text{ cm}^3$. Dividing, $540\pi \div 4\pi = \mathbf{135}$ cups.

50. Answer: (A) (i) and (ii) only

Statement (i) is true by definition of probability. Statement (ii) is true and is the standard converse test for a parallelogram. Statement (iii) is false: the mean of 4 and 7 is 5.5, which is neither observation. So only **(i) and (ii)** hold.