Sample Paper · Class 12

Questions	Marks each	Total marks	Time	Answers on
50	**2**	**100**	**1 hour**	**OMR sheet**

Instructions

1. This paper has **50 multiple-choice questions**. Each has four options, and only one is correct.
2. Each question carries **2 marks**. The paper is out of **100 marks**.
3. Time allowed: **1 hour**.
4. In the real exam, mark your answers on the **OMR sheet**. A practice OMR sheet is included before the answer key.
5. Score **70% or more** in Round 1 to qualify for Round 2 (national level).

Name _____ Class 12 Score _____ / 100

School _____

Questions

1. What is the determinant of the 3 × 3 matrix with rows (2, 0, 0), (0, 3, 0) and (0, 0, 4)?

(A) 21 **(B)** 22
(C) 23 **(D)** 24

2. If P(A ∩ B) = 1/5 and P(B) = 2/5, what is P(A | B)?

(A) 2 **(B)** 1/2
(C) 2/3 **(D)** 2/25

3. The corner points of a feasible region are (0, 0), (3, 0), (0, 7), (2, 5). What is the maximum of Z = 3x + 5y?

(A) 9 **(B)** 31
(C) 38 **(D)** 35

4. What is the dot product of (3, 4, −2) and (0, 1, 4)?

(A) −2 **(B)** −4
(C) −5 **(D)** −8

5. What are the order and degree of the differential equation $(d^2y/dx^2)^2 + dy/dx = 0$?

(A) Order 2, degree 2 **(B)** Order 2, degree 3
(C) Order 1, degree 1 **(D)** Order 3, degree 2

6. What is the derivative of sin x · cos x?

(A) 2 cos x **(B)** cos 2x
(C) −sin 2x **(D)** sin 2x

7. If $y = x^3 + 5x^2 + 3x$, what is dy/dx at $x = 2$?

(A) 35 **(B)** 32
(C) 34 **(D)** 25

8. What is the value of the integral of x from 0 to 5?

(A) 5 **(B)** 25/2
(C) 27/2 **(D)** 25

9. What is the distance between the points $(-2, 3, 2)$ and $(0, 9, 11)$?

(A) $\sqrt{11}$ units **(B)** 17 units
(C) 11 units **(D)** 12 units

10. The principal value of $\sin^{-1}(-1/2)$ is:

(A) $\pi/6$ **(B)** $-\pi/3$
(C) $-\pi/6$ **(D)** $7\pi/6$

11. What is the value of the integral of $(3x^2 + 2x)$ from 0 to 1?

(A) 1 **(B)** 5/2
(C) 3 **(D)** 2

12. A is a 2×3 matrix and B is a 3×4 matrix. What is the order of AB?

(A) 3×3 **(B)** 2×3
(C) 2×4 **(D)** 4×2

13. How many relations are possible on a set with 3 elements?

(A) 511 **(B)** 512
(C) 9 **(D)** 8

14. What is the magnitude of the vector $2i + 6j + 9k$?

(A) 121 **(B)** 17
(C) 12 **(D)** 11

15. What is the derivative of e^{2x}?

(A) $2xe^{2x}$ **(B)** $2e^{2x}$
(C) e^{2x} **(D)** $e^{2x}/2$

16. What is the determinant of the 2×2 matrix with rows (8, 2) and (4, 8)?

(A) -56 **(B)** -16
(C) 72 **(D)** 56

17. What is the distance between the points $(-3, -3, -2)$ and $(-1, 3, 7)$?

(A) 11 units **(B)** 12 units
(C) 17 units **(D)** $\sqrt{11}$ units

18. What are the order and degree of the differential equation $(dy/dx)^3 + y = x$?

(A) Order 1, degree 4 **(B)** Order 1, degree 3
(C) Order 3, degree 1 **(D)** Order 2, degree 3

19. What is the determinant of the 3 × 3 matrix with rows (2, 1, 0), (1, 2, 0) and (0, 0, 3)?

(A) 12 **(B)** 7
(C) 11 **(D)** 9

20. The corner points of a feasible region are (0, 0), (5, 0), (0, 6), (4, 3). What is the maximum of $Z = 4x + 6y$?

(A) 36 **(B)** 40
(C) 20 **(D)** 34

21. If $y = x^3 + x^2 + 4x$, what is dy/dx at $x = 3$?

(A) 33 **(B)** 34
(C) 37 **(D)** 48

22. What is the value of the integral of x from 0 to 4?

(A) 16 **(B)** 4
(C) 9 **(D)** 8

23. What is the determinant of the 2 × 2 matrix with rows (6, 3) and (5, 7)?

(A) 27 **(B)** −17
(C) 57 **(D)** −27

24. The principal value of $\cos^{-1}(0)$ is:

(A) $-\pi/2$ **(B)** π
(C) $\pi/2$ **(D)** 0

25. What is the dot product of (4, −1, 2) and (−2, −2, 0)?

(A) −9 **(B)** −6
(C) −7 **(D)** −2

26. The corner points of a feasible region are (0, 0), (3, 0), (0, 7), (3, 3). What is the maximum of $Z = 6x + 6y$?

(A) 36 **(B)** 42
(C) 48 **(D)** 18

27. What is the determinant of the 2 × 2 matrix with rows (9, 1) and (2, 4)?

(A) 1 **(B)** 38
(C) 34 **(D)** −34

28. What is the dot product of (0, 1, −2) and (−1, 4, 0)?

(A) 4 **(B)** 8
(C) 3 **(D)** 1

29. What are the order and degree of the differential equation $d^3y/dx^3 + x(dy/dx) = 0$?

(A) Order 3, degree 1 **(B)** Order 1, degree 3
(C) Order 4, degree 1 **(D)** Order 3, degree 2

30. What is the distance between the points (−2, 0, 2) and (0, 6, 11)?

(A) 12 units **(B)** $\sqrt{11}$ units
(C) 11 units **(D)** 17 units

31. What is the determinant of the 3 × 3 matrix with rows (1, 2, 0), (0, 1, 3) and (0, 0, 2)?

(A) 2 **(B)** 0
(C) 3 **(D)** 5

32. If P(A ∩ B) = 1/8 and P(B) = 1/2, what is P(A | B)?

(A) 1/16 **(B)** 5/12
(C) 1/4 **(D)** 4

33. What is the magnitude of the vector 6i + 2j + 3k?

(A) 7 **(B)** 8
(C) 49 **(D)** 11

34. What is the distance between the points (2, −3, −1) and (8, −1, 2)?

(A) √7 units **(B)** 11 units
(C) 8 units **(D)** 7 units

35. A is a 4 × 2 matrix and B is a 2 × 3 matrix. What is the order of AB?

(A) 2 × 2 **(B)** 4 × 2
(C) 3 × 4 **(D)** 4 × 3

36. What is the determinant of the 2 × 2 matrix with rows (4, 4) and (3, 6)?

(A) 12 **(B)** 36
(C) −2 **(D)** −12

37. The corner points of a feasible region are (0, 0), (3, 0), (0, 8), (3, 2). What is the maximum of Z = 4x + 6y?

(A) 12 **(B)** 52
(C) 24 **(D)** 48

38. What is the dot product of (2, −3, −2) and (−1, −2, 3)?

(A) −2 **(B)** −4
(C) −6 **(D)** −1

39. If P(A ∩ B) = 1/4 and P(B) = 1/2, what is P(A | B)?

(A) 2/3 **(B)** 2
(C) 1/8 **(D)** 1/2

40. The principal value of $\sin^{-1}(1/2)$ is:

(A) π/4 **(B)** π/3
(C) π/6 **(D)** 5π/6

41. If $y = x^3 + 3x^2 + 4x$, what is dy/dx at x = 1?

(A) 10 **(B)** 8
(C) 9 **(D)** 13

42. The corner points of a feasible region are (0, 0), (4, 0), (0, 3), (5, 5). What is the maximum of Z = 3x + 2y?

(A) 6 **(B)** 25
(C) 28 **(D)** 12

43. If $y = x^3 + 2x^2 + 6x$, what is dy/dx at $x = 1$?

(A) 7 **(B)** 11
(C) 13 **(D)** 9

44. What is the dot product of (3, 1, 4) and (4, −2, 3)?

(A) 22 **(B)** 20
(C) 25 **(D)** 24

45. What is the determinant of the 3 × 3 matrix with rows (1, 0, 2), (0, 2, 0) and (1, 0, 3)?

(A) 3 **(B)** 4
(C) 0 **(D)** 2

46. What is the distance between the points (1, 1, 0) and (7, 3, 3)?

(A) 8 units **(B)** √7 units
(C) 11 units **(D)** 7 units

47. If $P(A \cap B) = 3/10$ and $P(B) = 3/5$, what is $P(A \mid B)$?

(A) 9/50 **(B)** 2/3
(C) 2 **(D)** 1/2

48. What is the determinant of the 2 × 2 matrix with rows (5, 5) and (1, 6)?

(A) 25 **(B)** −25
(C) 35 **(D)** 19

49. What is the dot product of (4, 0, −2) and (3, 4, 3)?

(A) 2 **(B)** 8
(C) 5 **(D)** 6

50. If $y = x^3 + x^2 + 6x$, what is dy/dx at $x = 1$?

(A) 11 **(B)** 10
(C) 5 **(D)** 8

Practice OMR sheet

Fill one circle for each question, using a dark pen. Practising this now saves time in the real exam.

1	A	B	C	D
2	A	B	C	D
3	A	B	C	D
4	A	B	C	D
5	A	B	C	D
6	A	B	C	D
7	A	B	C	D
8	A	B	C	D
9	A	B	C	D
10	A	B	C	D
11	A	B	C	D
12	A	B	C	D
13	A	B	C	D
14	A	B	C	D
15	A	B	C	D
16	A	B	C	D
17	A	B	C	D
18	A	B	C	D
19	A	B	C	D
20	A	B	C	D
21	A	B	C	D
22	A	B	C	D
23	A	B	C	D
24	A	B	C	D
25	A	B	C	D

26	A	B	C	D
27	A	B	C	D
28	A	B	C	D
29	A	B	C	D
30	A	B	C	D
31	A	B	C	D
32	A	B	C	D
33	A	B	C	D
34	A	B	C	D
35	A	B	C	D
36	A	B	C	D
37	A	B	C	D
38	A	B	C	D
39	A	B	C	D
40	A	B	C	D
41	A	B	C	D
42	A	B	C	D
43	A	B	C	D
44	A	B	C	D
45	A	B	C	D
46	A	B	C	D
47	A	B	C	D
48	A	B	C	D
49	A	B	C	D
50	A	B	C	D

Answer key

Check your answers. Your score = number of correct answers × 2 marks.

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

Want more practice? Registered students also get mock tests, and free weekend quizzes are open to everyone at mathsolympiad.net/wc.