CBSE Class 12 Mathematics

(SET–2) Answers key

Section A – MCQ Answers

1. 81
2. 32
3. 3
4. $a \times b = 0$
5. 1/3
6. 0.2
7. 2e^{2x}
8. $A^T = A$
9. 1/2
10. $x + 2y + 3z = 0$
11. $-\sin x$
12. $\sin x + C$
13. $P(A \cap B) = 0$
14. $\sqrt{29}$
15. Bernoulli Distribution
16. 1
17. $x^3 + C$
18. 1
19. $\tan^{-1}x + C$
20. 0

Section B

21. Inverse of Matrix

|A| = (2×1 − 1×1) = 1

$$A^{-1} = \begin{bmatrix} 1 & -1 \\ -1 & 2 \end{bmatrix}$$

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22. Differentiation

$$y = e^x \sin\ x$$

Using product rule:

$$\frac{dy}{dx} = e^x(\sin\ x + \cos\ x)$$

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23. Normal Equation

Slope of tangent = $3x^2$

At x=1 → 3

Slope of normal = −1/3

Equation:

$$y - 1 = -\frac{1}{3}(x - 1)$$

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24. Integration

$$\int x\sqrt{x}dx = \int x^{3/2}dx$$
$$= \frac{2}{5}x^{5/2} + C$$

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25. Unit Vector

Vector = 2i − 2j + k

Magnitude:

$$= \sqrt{4 + 4 + 1} = 3$$

Unit vector:

$$\frac{2}{3}i - \frac{2}{3}j + \frac{1}{3}k$$

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26. Probability of Queen

Total queens = 4

$$P = 4/52 = 1/13$$

Section C

27. Solution by Determinants

x = 1
y = 3

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28. Differentiation

Given:

$$x^2 - xy + y^2 = 7$$

Differentiating:

$$2x - (x\frac{dy}{dx} + y) + 2y\frac{dy}{dx} = 0$$
$$\frac{dy}{dx} = \frac{y - 2x}{2y - x}$$

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29. Definite Integral

$$\int_0^1 (x+1)^2 dx$$
$$= \frac{7}{3}$$

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30. Parallel Vectors

(4,6,2) = 2(2,3,1)

Hence parallel.

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31. Probability Sum 9 (Two Dice)

Favourable outcomes = 4

Total outcomes = 36

$$P = 4/36 = 1/9$$

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32. Differential Equation

$$dy/dx = x^2$$
$$y = \frac{x^3}{3} + C$$

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33. Area Under Curve

$$\int_0^1 x^2\,dx$$
$$= 1/3$$

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34. Equation of Sphere

$$(x-1)^2 + (y-2)^2 + (z-3)^2 = 16$$

Section D

35. Adjoint & Inverse

|A| = 21

$$A^{-1} = \frac{1}{21} adj(A)$$

(Adjoint calculated by cofactors method in exam.)

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36. Rolle's Theorem Verified

f(0) = 2
f(2) = 2

f'(x)=3x^2−6x

f'(x)=0 → x=0,2

Condition satisfied.

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37. Integration by Parts

$$\int x \ln x \, dx$$
$$= \frac{x^2}{2} \ln x - \frac{x^2}{4} + C$$

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38. Shortest Distance Formula Used

$$SD = \frac{|\,(a_2 - a_1) \cdot (b_1 \times b_2)\,|}{|\,b_1 \times b_2\,|}$$

(Final answer after calculation = 3)

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39. Mean

$$= 1(0.2) + 2(0.5) + 3(0.3)$$
$$= 2.1$$

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40. Differential Equation

$$\frac{dy}{dx} + y = e^x$$

Integrating factor = e^x

Solution:

$$y = Ce^{-x} + \frac{e^x}{2}$$