# CBSE Class 12 Mathematics

# (SET–6) Answers key

---

**Section A – MCQ Answers**

1. 192
2. 0
3. 4
4. $a \cdot b = 0$
5. 1
6. 0.8
7. 2
8. $A^T = A$
9. 3
10. 10
11. $-\frac{1}{\sqrt{1-x^2}}$
12. $\ln \mid x \mid + C$
13. $P(A \cap B) = 0$
14. 3
15. Product of diagonal elements
16. $\mid A \mid = 0$
17. $x^5 + C$
18. 3
19. $e - 1$
20. $n$

---

**Section B**

**21. Inverse**

$$| A |= (3 \times 1 - 2 \times 1) = 1$$
$$A^{-1} = \begin{bmatrix} 1 & -2 \\ -1 & 3 \end{bmatrix}$$

---

**22. Differentiation**

$$y = \ln (x^2)$$
$$\frac{dy}{dx} = \frac{2}{x}$$

---

**23. Tangent Equation**

$$y = x^3$$
$$dy/dx = 3x^2$$

At x=2 → slope=12

Point (2,8)

$$y - 8 = 12(x - 2)$$

---

**24. Integration**

$$\int (4x^3 - 2x)dx$$
$$= x^4 - x^2 + C$$

---

**25. Angle Between Vectors**

a=(1,2,3)
b=(2,1,1)

$$a \cdot b = 2 + 2 + 3 = 7$$

|a|=√14
|b|=√6

$$\cos\ \theta = \frac{7}{\sqrt{84}}$$

---

**26. Probability (Ace)**

Aces=4

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

---

**Section C**

**27. Solution**

x = 3

y = 1

---

**28. Differentiation**

$$x^2 + xy + y^2 = 7$$
$$2x + x\frac{dy}{dx} + y + 2y\frac{dy}{dx} = 0$$
$$\frac{dy}{dx} = \frac{-(2x + y)}{x + 2y}$$

---

**29. Definite Integral**

$$\int_0^2 (2x + 1)dx$$
$$= [x^2 + x]_0^2$$
$$= 4 + 2 = 6$$

---

**30. Collinear**

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

Hence collinear.

---

**31. Sum 10 (Two Dice)**

Favourable outcomes=3

$$P = 3/36 = 1/12$$

---

**32. Differential Equation**

$$dy/dx = x^3$$
$$y = x^4/4 + C$$

---

**33. Area**

$$\int_0^2 3x dx$$
$$= 6$$

---

**34. Sphere Equation**

$$(x-2)^2 + (y-1)^2 + (z-3)^2 = 25$$

---

**Section D**

**35. Determinant**

$$| A |= 16$$

Since ≠0 → invertible

$$A^{-1} = \frac{1}{16}\begin{bmatrix} 8 & -2 & -2 \\ -2 & 8 & -2 \\ -2 & -2 & 8 \end{bmatrix}$$

---

**36. Lagrange MVT**

$$\frac{f(2)-f(0)}{2}=2$$

f'(x)=2x

2c=2

c=1

Condition satisfied.

---

**37. Integration by Parts**

$$\int x^2\cos\ x dx$$
$$=x^2\sin\ x+2x\cos\ x-2\sin\ x+C$$

---

**38. Shortest Distance**

Using formula:

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

(Final value after solving = 2)

---

**39. Binomial (n=5, p=1/2)**

Mean:

$$np=5/2$$

Variance:

$$npq=5/4$$

---

**40. Differential Equation**

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

$$\frac{d}{dx}(xy) = x^2$$
$$xy = x^3/3 + C$$
$$y = x^2/3 + \frac{C}{x}$$