CUET 2025 Paper 1

1. If A and B are square matrices of the same order, then $(A+B)(A-B)$ is equal to:

   (1) $A^2 - B^2$
   (2) $A^2 - B^2 + BA - AB$
   (3) $A^2 - BA - AB - B^2$
   (4) $B^2 + A^2 + AB - BA$

2. Let the degree and order of the differential equation $2x^3\frac{dy}{dx} - 5\left(\frac{d^2y}{dx^2}\right)^2 = 6\left(\frac{dy}{dx}\right)^3$ be m and n respectively. Then:

   (A) $m = 2$
   (B) $n = 3$
   (C) $m = 3$
   (D) $mn = 4$

   Choose the correct answer from the options given below:

   (1) (A) and (B) only
   (2) (A) and (D) only
   (3) (B) and (C) only
   (4) (B) and (D) only

3. If A and B are invertible matrices of same order, then which one of the following is NOT true?

   (1) $(AB)^{-1} = B^{-1}A^{-1}$
   (2) $\text{adj}(AB) = (\text{adj } A)(\text{adj } B)$
   (3) $\text{adj } A^T = (\text{adj } A)^T$
   (4) $|A^{-1}| = (|A|)^{-1}$

4. The area (in sq. units) of the region bounded by the curve $y = 2x^3$, x-axis and ordinates $x = -1$ and $x = 1$ is:

   (1) 1
   (2) 2
   (3) 3
   (4) $\frac{3}{2}$

5. If $A = \begin{bmatrix} 2a+b & a-2b \\ -5c-d & 4c+3d \end{bmatrix} = \begin{bmatrix} 4 & -3 \\ 11 & 24 \end{bmatrix}$, then then the value of $a + 2b - 3c + 4d$ is equal to:

   (1) 4
   (2) 12
   (3) 24
   (4) 30

6. The function $f(x) = x + \frac{a^2}{x}, a > 0, x \neq 0$ has a local maxima at:

   (1) $x = -a$
   (2) $x = a$
   (3) $x = \frac{1}{a}$
   (4) $x = -\frac{1}{a}$

7. If corner points of the bounded feasible region are $(0,0)$ and $(0,3)$ and objective function is $Z = 4x + 7y$, then the maximum value of Z is:

   (1) 12
   (2) 21
   (3) 27
   (4) 17

8. $\int \frac{x^3 - 1}{x^2} dx$ is equal to:

   (1) $\frac{x^2}{2} + x + c$ Where c is constant of integration

(2) $\frac{x^2}{2} - \frac{1}{x} + c$ Where c is constant of integration

(3) $\frac{x^2}{2} - x + c$ Where c is constant of integration

(4) $\frac{x^2}{2} + \frac{1}{x} + c$ Where c is constant of integration

9. The general solution of the differential equation $\log_e\left(\frac{dy}{dx}\right) = ax + by$ is:

(1) $\frac{e^{-ax}}{a} + \frac{e^{by}}{b} + C = 0$

(2) $\frac{e^{-ax}}{a} - \frac{e^{by}}{b} + C = 0$

(3) $\frac{e^{ax}}{a} + \frac{e^{-by}}{b} + C = 0$

(4) $\frac{e^{ax}}{a} - \frac{e^{-by}}{b} + C = 0$

10. If $f(x) = x^3 \log_e x$, then $f''(e^2)$ is equal to:

(1) $5e^4 + 12e^2$

(2) $17e^2$

(3) $12e^4 + 5e^2$

(4) $17e^4$

11. A random variable X has the following probability distribution:

X	0	1	2	3	4	5	6	7
P(X)	0	k	2k	2k	3k	k^2	2k^2	7k$^2 + k$

The value of $P(4 < x < 7)$ is equal to:

(1) $\frac{3}{100}$

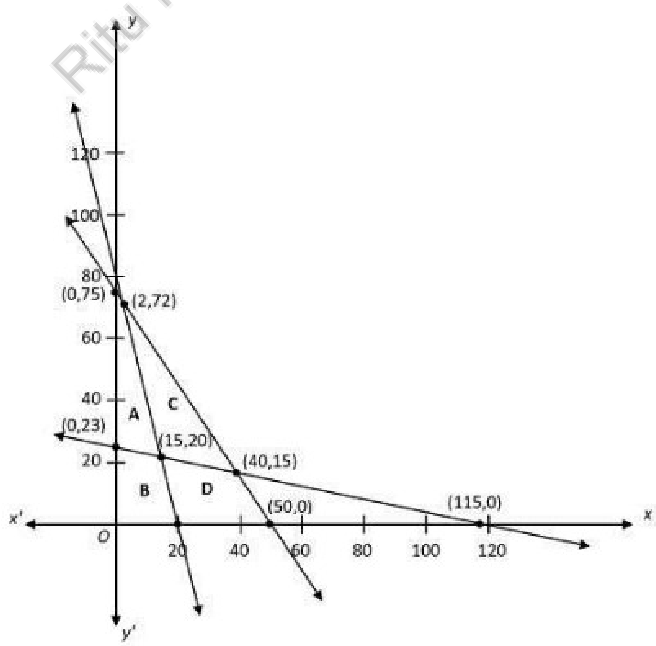
(2) $\frac{1}{2}$

(3) $\frac{5}{100}$

(4) $\frac{7}{100}$

12. In the given figure, feasible region represented by the constraints

$$4x + y \geq 80, \quad x + 5y \geq 115, \quad 3x + 2y \leq 150, \quad x, y \geq 0$$



(1) Region A

(2) Region B

(3) Region C

(4) Region D

13. If the system of equations $x + 2y + 3z = 10,\ -x + y + \lambda z = 20,\ 2x + 3y + \lambda z = 0$ does not possess a unique solution, then λ is equal to:

(1) 1
(2) $\frac{15}{4}$
(3) $\frac{4}{15}$
(4) -1

14. The function $f(x) = x^4 - 2x^2$ is increasing on:

(1) $(-1, 0) \cup (1, \infty)$
(2) $(-\infty, -1) \cup (0, 1)$
(3) $(-\infty, \infty)$
(4) $(-\infty, 0) \cup (1, \infty)$

15. The value of which of the following integrals is zero?
(A) $\int_0^1 x\,dx$
(B) $\int_{-1}^1 x\,dx$
(C) $\int_{-1}^1 x^2\,dx$
(D) $\int_0^1 \log\left(\frac{x}{1-x}\right) dx$
Choose the correct answer from the options given below:

(1) (B) and (D) only
(2) (A), (B) and (C) only
(3) (B) only
(4) (C) and (D) only

16. Let B and F are events associated with an experiment. if $P(B) = 0.4, P(F) = 0.8, P(F|B) = 0.6$. Then $P(B|F)$ is:

(1) 0.4
(2) 0.2
(3) 0.3
(4) 0.5

17. The area (in sq. units) of the region bounded by the line $y = x + 2, x = 0, x = 1, y = 0$ is:

(1) 9
(2) $\frac{5}{2}$
(3) 18
(4) $\frac{9}{2}$

18. The area of the region enclosed by ellipse $16x^2 + 25y^2 = 400$ is:

(1) 400π
(2) 200π
(3) 40π
(4) 20π

19. The vector equation of the line passing through points $A(3, 4, -7)$ and $B(1, -1, 6)$ is:

(1) $\vec{r} = 3\hat{i} + 4\hat{j} - 7\hat{k} + \lambda(\hat{i} - \hat{j} + 6\hat{k})$
(2) $\vec{r} = (3 - 2\lambda)\hat{i} + (4 - 5\lambda)\hat{j} + (-7 + 13\lambda)\hat{k}$
(3) $\vec{r} = \hat{i} - \hat{j} + 6\hat{k} + \lambda(3\hat{i} + 4\hat{j} - 7\hat{k})$
(4) $\vec{r} = (-2 + 3\lambda)\hat{i} + (-5 + 4\lambda)\hat{j} + (13 - 7\lambda)\hat{k}$

20. Which of the following statements are correct?
(A) $P(E \cap F) = P(E)P(F)$ if E, F independent.
(B) $P(E \cup F) = P(E) + P(F) - P(E)P(F)$ if E, F mutually exclusive.
(C) $P(E|F) = \frac{P(E \cap F)}{P(F)}$ if $P(F) \neq 0$.
(D) if E and F be the events associated with the sample space S of an experiment, then $P(\bar{E} \mid F)$ =2-P(E $\mid F)$.
Choose the correct answer from options:

(1) (A) and (C) only
(2) (A), (B) and (C) only
(3) (B) and (D) only
(4) (C) and (D) only

21. Let

$$A = \begin{bmatrix} 1 & \sin\theta & 1 \\ -\sin\theta & 1 & \sin\theta \\ -1 & -\sin\theta & 1 \end{bmatrix}, \quad 0 \le \theta \le 2\pi.$$

Then which of the following are true?

(A) $|A| = 2 + 2\sin^2\theta$
(B) $|A| = 2 + \sin^2\theta$
(C) minimum value of $|A|$ is 1
(D) maximum value of $|A|$ is 4

Choose the **correct** answer from the options given below:

(1) (A) and (D) only
(2) (A), (B) and (C) only
(3) (B), (C) and (D) only
(4) (C) and (D) only

22. Consider the LPP: Maximize $Z = x + y$ subject to $x + 2y \le 70, 2x + y \le 95, x, y \ge 0$. The optimal solution is:

(1) (20,35)
(2) (35,20)
(3) (30,15)
(4) (40,15)

23. Match List-I with List-II:

List-I	List-II
(A) f(x) = $\begin{cases} \frac{x}{\lvert x\rvert}, & x \neq 0 \\ 0, & x = 0 \end{cases}$	(I) continuous but not differentiable at $x = 0$
(B) $f(x) = \lvert x\rvert$	(II) continuous but not differentiable at $x = 1$
(C) $f(x) = \lvert x^2 - 1\rvert$	(III) discontinuous at $x = 0$
(D) $f(x) = \lvert x - 1\rvert$	(IV) continuous but not differentiable at $x = 1, -1$

Choose the correct answer:

(1) (A)-(III), (B)-(I), (C)-(IV), (D)-(II)
(2) (A)-(IV), (B)-(I), (C)-(II), (D)-(III)
(3) (A)-(III), (B)-(I), (C)-(II), (D)-(IV)
(4) (A)-(IV), (B)-(III), (C)-(I), (D)-(II)

24. Match List-I with List-II (Integrating factors):

List-I	List-II
(A) $x\frac{dy}{dx} - y = 2x^2$	(I) e^{-y}
(B) $\frac{dy}{dx} + \frac{y}{x} = 2x$	(II) $\frac{1}{x}$
(C) $x\frac{dy}{dx} + 2y = x^2 \log x$	(III) x
(D) $\frac{dx}{dy} - x = y$	(IV) x^2

Choose the correct answer:

(1) (A)-(IV), (B)-(I), (C)-(II), (D)-(III)
(2) (A)-(I), (B)-(II), (C)-(III), (D)-(IV)
(3) (A)-(II), (B)-(III), (C)-(IV), (D)-(I)
(4) (A)-(III), (B)-(IV), (C)-(I), (D)-(II)

25. For $f(x) = \sin x + \cos x, x \in [0, \pi]$, which is correct?

(1) Point of absolute maxima is π

(2) Absolute maximum value is $\sqrt{2}$

(3) Absolute minimum value is 0

(4) Point of absolute maxima is 0

26. If $\vec{a}, \vec{b}, \vec{c}$ are mutually perpendicular unit vectors, $|\vec{a} + \vec{b} + \vec{c}|$ is:

(1) 3

(2) 9

(3) $\sqrt{3}$

(4) 0

27. In which interval is $f(x) = -x^2 - 2x + 15$ decreasing?

(1) $(-1, \infty)$

(2) $(-\infty, -1)$

(3) $(-\infty, 2)$

(4) $(0, -1)$

28. The value of

$$\tan^{-1}(1) + \cos^{-1}\left(-\frac{\sqrt{3}}{2}\right) + \sin^{-1}\left(\frac{1}{2}\right)$$

is

(1) $\frac{5\pi}{4}$

(2) $\frac{\pi}{4}$

(3) $\frac{5\pi}{12}$

(4) $\frac{7\pi}{12}$

29. Let A=(a,b,c). Then number of relations containing (a,b) and (b,c) which are reflexive and transitive but not symmetric is

(1) 1

(2) 2

(3) 3

(4) 4

30. Match List-I with List-II

List-I (Type of matrix)	List-II (Conditions)
(A) Square matrix A	(I) $A = [a_{ij}]_{m\times m}$ where $\begin{cases} a_{ij} = 0, & i \neq j \\ a_{ij} = k, & i = j,\ k \neq 0\,\text{constant} \end{cases}$
(B) Scalar matrix A	(II) $A = [a_{ij}]_{m\times m}$
(C) Diagonal matrix A	(III) $A = [a_{ij}]_{m\times m}$ where $\begin{cases} a_{ij} = 0, & i \neq j \\ a_{ij} = 1, & i = j \end{cases}$
(D) Identity matrix A	(IV) $A = [a_{ij}]_{m\times m}$ where $a_{ij} = 0,\ i \neq j$

Choose the **correct** answer from the options given below:

(1) (A) – (II), (B) – (IV), (C) – (I), (D) – (III)

(2) (A) – (II), (B) – (I), (C) – (III), (D) – (IV)

(3) (A) – (II), (B) – (I), (C) – (IV), (D) – (III)

(4) (A) – (II), (B) – (I), (C) – (IV), (D) – (III)

31. Consider two lines l_1 and l_2 with cartesian equations

$$\frac{x}{2} = \frac{1-y}{-2} = \frac{z}{1} \quad \text{and} \quad \frac{2x-5}{16} = \frac{y-2}{-1} = \frac{z-5}{4}$$

respectively. Which of the following is/are true?

(A) Direction ratio of l_1 are $2, 2, 1$

(B) Direction cosines of l_1 are $\frac{2}{3}, \frac{-2}{3}, \frac{1}{3}$

(C) Direction ratio of l_2 are $16, -1, 4$

(D) Angle between l_1 and l_2 is $\cos^{-1}\left(\frac{38}{3\sqrt{273}}\right)$

Choose the **correct** answer from the options given below:

(1) (B), (C) and (D) only

(2) (A) and (B) only

(3) (C) and (D) only

(4) (A) only

32. Consider $f(x) = x^3 - 3x$. Match List-I with List-II:

List-I	List-II
(A) Point of local maxima	(I) 1
(B) Point of local minima	(II) -1
(C) Local maximum value	(III) 2
(D) Local minimum value	(IV) -2

Choose the correct answer:

(1) (A)-(II), (B)-(I), (C)-(III), (D)-(IV)

(2) (A)-(I), (B)-(II), (C)-(III), (D)-(IV)

(3) (A)-(III), (B)-(IV), (C)-(I), (D)-(II)

(4) (A)-(IV), (B)-(III), (C)-(I), (D)-(II)

33. If $A = [1\ 2\ 3], B = \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}$, then BA is:

(1) [14]

(2) [1 4 9]

(3) $\begin{bmatrix} 1 & 2 & 3 \\ 2 & 4 & 6 \\ 3 & 6 & 9 \end{bmatrix}$

(4) $\begin{bmatrix} 1 \\ 4 \\ 9 \end{bmatrix}$

34. If θ is an acute angle and the vector $\vec{a} = (\sin\theta)\hat{i} + (\cos\theta)\hat{j}$ is perpendicular to the vector $\vec{b} = \hat{i} - \sqrt{3}\hat{j}$, then θ is equal to

(1) $\frac{\pi}{6}$

(2) $\frac{\pi}{3}$

(3) $\frac{\pi}{4}$

(4) $\frac{\pi}{2}$

35. The function $f(x) = \lfloor x \rfloor$, where $\lfloor x \rfloor$ denotes the greatest integer function, is continuous at $x =$

(A) 2.9

(B) 5

(C) -3

(D) 6.5

Choose the **correct** answer from the options given below:

(1) (A), (B) and (C) only
(2) (B), (C) and (D) only
(3) (A) and (D) only
(4) (C) and (D) only

36. The general solution of the differential equation

$$y\,dx - (x + 2y^2)\,dy = 0$$

is

(1) $\frac{x}{y} = 2x + C$, Where C is constant of integration
(2) $y = 2x^2 + C$, Where C is constant of integration
(3) $\frac{y}{x} = 2y + C$, Where C is constant of integration
(4) $x = 2y^2 + Cy$, Where C is constant of integration

37. A die is thrown three times. If the first throw is a five, probability of sum 14 is:

(1) $\frac{1}{9}$
(2) $\frac{1}{18}$
(3) $\frac{1}{36}$
(4) $\frac{1}{54}$

38. The feasible region associated with the inequality $2x + 3y > 4$ is:

(1) Open half plane containing the origin
(2) Open half plane not containing the origin
(3) Closed half plane containing the origin
(4) Closed half plane not containing the origin

39. If $y = 3^x + e^x + x^x + x^3$, then $\frac{dy}{dx}$ at $x = 3$ is:

(1) $e^3 + 27\log_3 3 + 27$
(2) $e^3 + 54\log_3 3 + 54$
(3) $e^3 + 54\log_3 3 + 27$
(4) $e^3 + 27\log_3 3 + 54$

40. $\displaystyle\int \frac{dx}{9x^2 - 16}$ is equal to:

(1) $\frac{1}{24}\ln\left|\frac{3x+4}{3x-4}\right| + C$
(2) $\frac{3}{8}\ln\left|\frac{3x+4}{3x-4}\right| + C$
(3) $\frac{3}{8}\ln\left|\frac{3x-4}{3x+4}\right| + C$
(4) $\frac{1}{24}\ln\left|\frac{3x-4}{3x+4}\right| + C$

41. If a line makes angles α, β, γ with the positive directions of x, y, z axes respectively, then $\cos 2\alpha + \cos 2\beta + \cos 2\gamma$ is equal to:

(1) 1
(2) -1
(3) 1/2
(4) -1/2

42. Let $A + B = \begin{bmatrix} 2 & -2 & -4 \\ -1 & 3 & 4 \\ 1 & -2 & -3 \end{bmatrix}$, where A is symmetric matrix of order 3. Then $|B|$ is:

(1) 0
(2) 1
(3) 3
(4) 27

43. $\displaystyle\int \sin x \sin 2x \sin 3x\,dx$ is equal to:

(1) $-\frac{1}{48}(6\cos 2x + 3\cos 4x + 2\cos 6x) + C$
(2) $-\frac{1}{48}(2\cos 2x + 3\cos 4x - 6\cos 6x) + C$
(3) $-\frac{1}{48}(6\cos 2x + 3\cos 4x - 2\cos 6x) + C$
(4) $-\frac{1}{48}(2\cos 2x + 3\cos 4x + 6\cos 6x) + C$

44. The projection of $\vec{a} = \hat{i} + 2\hat{j} - 3\hat{k}$ on $2\hat{i} + 6\hat{j} + 3\hat{k}$ is:

(1) $\frac{5}{\sqrt{14}}$
(2) $\frac{5}{7}$
(3) 0
(4) $\frac{5}{14}$

45. If points (2,-3), (λ,-1), (0,4) are collinear, then λ is:

(1) $\frac{6}{7}$
(2) $-\frac{6}{7}$
(3) $-\frac{10}{7}$
(4) $\frac{10}{7}$

46. Let $f : \mathbb{R} \to \mathbb{R}$ be defined by $f(x) = x^4$. Which is true?

(1) f is one-one and onto
(2) f is one-one but not onto
(3) f is onto but not one-one
(4) f is neither one-one nor onto

47. Match List-I with List-II:

List-I	List-II
(A) Angle between $\hat{i} - \hat{j}$ and $\hat{j} + \hat{k}$	(I) 0
(B) Angle between $2\hat{j} - \hat{k}$ and $\hat{j} + 2\hat{k}$	(II) $\frac{2\pi}{3}$
(C) Angle between $\hat{i} + 2\hat{j}$ and $5\hat{i} + 10\hat{j}$	(III) $\frac{\pi}{6}$
(D) Angle between $\sqrt{3}\hat{i} + \hat{j}$ and $\hat{i}$	(IV) $\frac{\pi}{2}$

Choose the correct answer:

(1) (A)-(II), (B)-(IV), (C)-(I), (D)-(III)
(2) (A)-(IV), (B)-(II), (C)-(III), (D)-(I)
(3) (A)-(II), (B)-(IV), (C)-(III), (D)-(I)
(4) (A)-(IV), (B)-(II), (C)-(I), (D)-(III)

48. $\displaystyle\int_{\pi/6}^{\pi/3} \frac{dx}{1 + \sqrt{\tan x}}$ is equal to:

(1) $\frac{\pi}{4}$
(2) $\frac{\pi}{2}$
(3) $\frac{\pi}{6}$
(4) $\frac{\pi}{12}$

49. If A, B are matrices of same order, then $AB^T - BA^T$ is always:

(1) Symmetric matrix
(2) Skew-symmetric matrix
(3) Neither symmetric nor skew-symmetric
(4) Null matrix

50. One person speaks truth in 60% cases and another in 80%. They are likely to agree in:

(1) 48% of the cases
(2) 56% of the cases
(3) 58% of the cases
(4) 70% of the cases