ST. ANNE'S ACADEMY
(MATHS & PHYSICS TUITION CENTRE)
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ONE MARK QUESTIONS
CLASS – XII - MATHEMATICS

1) If $|\text{adj}(\text{adj } A)| = |A|^9$, then the order of the square matrix A is
(1) 3 (2) 4 (3) 2 (4) 5

2) If $A = \begin{bmatrix} 2 & 0 \\ 1 & 5 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 4 \\ 2 & 0 \end{bmatrix}$ then $|\text{adj}(AB)| =$
(1) -40 (2) -80 (3) -60 (4) -20

3) Which of the following is/are correct?
(i) Adjoint of a symmetric matrix is also a symmetric matrix.
(ii) Adjoint of a diagonal matrix is also a diagonal matrix.
(iii) If A is a square matrix of order n and λ is a scalar, then $\text{adj}(\lambda A) = \lambda^n \text{adj}(A)$.
(iv) $A(\text{adj}A) = (\text{adj}A)A = |A| I$
(1) Only (i) (2) (ii) and (iii) (3) (iii) and (iv) (4) (i), (ii) and (iv)

4) If $A = \begin{bmatrix} 3 & -3 & 4 \\ 2 & -3 & 4 \\ 0 & -1 & 1 \end{bmatrix}$, then $\text{adj}(\text{adj } A)$ is
(1) $\begin{bmatrix} 3 & -3 & 4 \\ 2 & -3 & 4 \\ 0 & -1 & 1 \end{bmatrix}$ (2) $\begin{bmatrix} 6 & -6 & 8 \\ 4 & -6 & 8 \\ 0 & -2 & 2 \end{bmatrix}$ (3) $\begin{bmatrix} -3 & 3 & -4 \\ -2 & 3 & -4 \\ 0 & 1 & -1 \end{bmatrix}$ (4) $\begin{bmatrix} 3 & -3 & 4 \\ 0 & -1 & 1 \\ 2 & -3 & 4 \end{bmatrix}$

5) If $\text{adj } A = \begin{bmatrix} 2 & 3 \\ 4 & -1 \end{bmatrix}$ and $\text{adj } B = \begin{bmatrix} 1 & -2 \\ -3 & 1 \end{bmatrix}$ then $\text{adj}(AB)$ is
(1) $\begin{bmatrix} -7 & -1 \\ 7 & -9 \end{bmatrix}$ (2) $\begin{bmatrix} -6 & 5 \\ -2 & -10 \end{bmatrix}$ (3) $\begin{bmatrix} -7 & 7 \\ -1 & -9 \end{bmatrix}$ (4) $\begin{bmatrix} -6 & -2 \\ 5 & -10 \end{bmatrix}$

6) If $A = \begin{bmatrix} 7 & 3 \\ 4 & 2 \end{bmatrix}$, then $9I_2 - A =$
(1) A^{-1} (2) $\frac{A^{-1}}{2}$ (3) $3A^{-1}$ (4) $2A^{-1}$

7) If A is a 3×3 non-singular matrix such that $AA^T = A^T A$ and $B = A^{-1}A^T$, then $BB^T =$
(1) A (2) B (3) I_3 (4) B^T

8) If $A = \begin{bmatrix} 2 & 3 \\ 5 & -2 \end{bmatrix}$ be such that $\lambda A^{-1} = A$, then λ is
(1) 17 (2) 14 (3) 19 (4) 21

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9) If $A=\begin{bmatrix} \frac{3}{5} & \frac{4}{5} \\ x & \frac{3}{5} \end{bmatrix}$ and $A^T = A^{-1}$, then the value of x is

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

10) Let $A=\begin{bmatrix} 2 & -1 & 1 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{bmatrix}$ and $4B=\begin{bmatrix} 3 & 1 & -1 \\ 1 & 3 & x \\ -1 & 1 & 3 \end{bmatrix}$. If B is the inverse of A, then the value of x is

(1) 2 (2) 4 (3) 3 (4) 1

11) The rank of the matrix $\begin{bmatrix} 1 & 2 & 3 & 4 \\ 2 & 4 & 6 & 8 \\ -1 & -2 & -3 & -4 \end{bmatrix}$ is

(1) 1 (2) 2 (3) 4 (4) 3

12) If A, B and_C are invertible matrices of some order, then which one of the following is not true?

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

(3) $\det A^{-1} = (\det A)^{-1}$ (4) $(ABC)^{-1} = C^{-1}B^{-1}A^{-1}$

13) If A is a non-singular matrix such that $A^{-1}=\begin{bmatrix} 5 & 3 \\ -2 & -1 \end{bmatrix}$, then $(A^T)^{-1} =$

(1) $\begin{bmatrix} -5 & 3 \\ 2 & 1 \end{bmatrix}$ (2) $\begin{bmatrix} 5 & 3 \\ -2 & -1 \end{bmatrix}$ (3) $\begin{bmatrix} -1 & -3 \\ 2 & 5 \end{bmatrix}$ (4) $\begin{bmatrix} 5 & -2 \\ 3 & -1 \end{bmatrix}$

14) If $A=\begin{bmatrix} \cos\theta & \sin\theta \\ -\sin\theta & \cos\theta \end{bmatrix}$ and $A(\text{adj } A)=\begin{bmatrix} k & 0 \\ 0 & k \end{bmatrix}$, then $k=$

(1) 0 (2) $\sin\theta$ (3) $\cos\theta$ (4) 1

15) If $\rho(A)=\rho([A \mid B])$, then the system $AX=B$ of linear equations is

(1) consistent and has a unique solution (2) consistent

(3) consistent and has infinitely many solution (4) inconsistent

16) If $A^T A^{-1}$ is symmetric, then $A^2 =$

(1) A^{-1} (2) $(A^T)^2$ (3) A^T (4) $(A^{-1})^2$

17) If $A=\begin{bmatrix}3 & 5\\ 1 & 2\end{bmatrix}$, $B=\text{adj}\,A$ and $C=3A$, then $\dfrac{|\text{adj}\,B|}{|C|}=$

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

18) If $P=\begin{bmatrix}1 & x & 0\\ 1 & 3 & 0\\ 2 & 4 & -2\end{bmatrix}$ is the adjoint of 3×3 matrix A and $|A|=4$, then x is

(1) 15 (2) 12 (3) 14 (4) 11

19) If $A=\begin{bmatrix}1 & \tan\frac{\theta}{2}\\ -\tan\frac{\theta}{2} & 1\end{bmatrix}$ and $AB=I_2$, then $B=$

(1) $\left(\cos^2\frac{\theta}{2}\right)A$ (2) $\left(\cos^2\frac{\theta}{2}\right)A^T$ (3) $(\cos^2\theta)I$ (4) $\left(\sin^2\frac{\theta}{2}\right)A$

20) If $A=\begin{bmatrix}3 & 1 & -1\\ 2 & -2 & 0\\ 1 & 2 & -1\end{bmatrix}$ and $A^{-1}=\begin{bmatrix}a_{11} & a_{12} & a_{13}\\ a_{21} & a_{22} & a_{23}\\ a_{31} & a_{32} & a_{33}\end{bmatrix}$ then the value of a_{23} is

(1) 0 (2) -2 (3) -3 (4) -1

21) If $A\begin{bmatrix}1 & -2\\ 1 & 4\end{bmatrix}=\begin{bmatrix}6 & 0\\ 0 & 6\end{bmatrix}$, then $A=$

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

22) If $x^a y^b = e^m, x^c y^d = e^n, \Delta_1=\begin{vmatrix}m & b\\ n & d\end{vmatrix}, \Delta_2=\begin{vmatrix}a & m\\ c & n\end{vmatrix}, \Delta_3=\begin{vmatrix}a & b\\ c & d\end{vmatrix}$,
then the values of x, y are respectively,

(1) $e^{(\Delta_2/\Delta_1)}, e^{(\Delta_3/\Delta_1)}$ (2) $\log(\Delta_1/\Delta_3), \log(\Delta_2/\Delta_3)$

(3) $\log(\Delta_2/\Delta_1), \log(\Delta_3/\Delta_1)$ (4)) $e^{(\Delta_1/\Delta_3)}, e^{(\Delta_2/\Delta_3)}$

23) If $0\le\theta\le\pi$ and the system of equations
$x+(\sin\theta)y-(\cos\theta)z=0, (\cos\theta)x-y+z=0,$
$z=0, (\cos\theta)x-y+z=0, (\sin\theta)x+y-z=0$ has a non-trivial solution then θ is

(1) $\frac{2\pi}{3}$ (2) $\frac{3\pi}{4}$ (3) $\frac{5\pi}{6}$ (4) $\frac{\pi}{4}$

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24) If $(AB)^{-1}=\begin{bmatrix}12 & -17\\ -19 & 27\end{bmatrix}$ and $A^{-1}=\begin{bmatrix}1 & -1\\ -2 & 3\end{bmatrix}$, then $B^{-1}=$

(1) $\begin{bmatrix}2 & -5\\ -3 & 8\end{bmatrix}$ (2) $\begin{bmatrix}8 & 5\\ 3 & 2\end{bmatrix}$ (3) $\begin{bmatrix}3 & 1\\ 2 & 1\end{bmatrix}$ (4) $\begin{bmatrix}8 & -5\\ -3 & 2\end{bmatrix}$

25) The augmented matrix of a system of linear equations is $\begin{bmatrix}1 & 2 & 7 & 3\\ 0 & 1 & 4 & 6\\ 0 & 0 & \lambda-7 & \mu+5\end{bmatrix}$

The system has infinitely many solutions if

(1) $\lambda=7,\mu\neq-5$ (2) $\lambda=-7,\mu=5$ (3) $\lambda\neq7,\mu\neq-5$ (4) $\lambda=7,\mu=-5$

26) If $\omega=cis\frac{2\pi}{3}$, then the number of distinct roots of $\begin{vmatrix}z+1 & \omega & \omega^2\\ \omega & z+\omega^2 & 1\\ \omega^2 & 1 & z+\omega\end{vmatrix}=0$

(1) 1 (2) 2 (3) 3 (4) 4

27) If $\frac{z-1}{z+1}$ is purely imaginary, then $|z|$ is

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

28) If $\left|z-\frac{3}{z}\right|=2$, then the least value of $|z|$ is

(1) 1 (2) 2 (3) 3 (4) 5

29) $i^n+i^{n+1}+i^{n+2}+i^{n+3}$ is

(1) 0 (2) 1 (3) -1 (4) i

30) If $\omega\neq1$ is a cubic root of unity and $(1+\omega)^7=A+B\omega$, then (A,B) equals

(1) (1,0) (2) (−1,1) (3) (0,1) (4) (1,1)

31) If $|z|=1$, then the value of $\frac{1+z}{1+\bar{z}}$ is

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

32) z_1, z_3, and z_3 are complex numbers such that $z_1+z_2+z_3=0$ and $|z_1|=|z_2|=|z_3|=1$ then $z_1^2+z_2^2+z_3^2$ is

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

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33) If $z = x + iy$ is a complex number such that $|z+2| = |z-2|$ then the locus of z is

(1) real axis (2) imaginary axis (3) ellipse (4) circle

34) If z is a complex number such that $z \in \mathbb{C} \setminus \mathbb{R}$ and $z + \frac{1}{z} \in \mathbb{R}$, then $|z|$ is

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

35) If $|z - 2 + i| \leq 2$, then the greatest value of $|z|$ is

(1) $\sqrt{3} - 2$ (2) $\sqrt{3} + 2$ (3) $\sqrt{5} - 2$ (4) $\sqrt{5} + 2$

36) If $(1+i)(1+2i)(1+3i)\cdots(1+ni) = x + iy$, then $2 \cdot 5 \cdot 10 \cdots (1+n^2)$ is

(1) 1 (2) i (3) $x^2 + y^2$ (4) $1 + n^2$

37) The solution of the equation $|z| - z = 1 + 2i$ is

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

38) The principal argument of $\frac{3}{-1+i}$ is

(1) $\frac{-5\pi}{6}$ (2) $\frac{-2\pi}{3}$ (3) $\frac{-3\pi}{4}$ (4) $\frac{-\pi}{2}$

39) If α and β are the roots of $x^2 + x + 1 = 0$, then $\alpha^{2020} + \beta^{2020}$ is

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

40) The value of $\left(\frac{1+\sqrt{3}i}{1-\sqrt{3}i}\right)^{10}$ is

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

41) If $|z_1| = 1,\ |z_2| = 2,\ |z_3| = 3$ and $|9z_1z_2 + 4z_1z_3 + z_2z_3| = 12$, then the value of $|z_1 + z_2 + z_3|$ is

(1) 1 (2) 2 (3) 3 (4) 4

42) The value of $\sum_{n=1}^{13}(i^n + i^{n-1})$ is

(1) $1 + i$ (2) i (3) 1 (4) 0

43) The product of all four values of $\left(\cos\frac{\pi}{3} + i\sin\frac{\pi}{3}\right)^{\frac{3}{4}}$ is

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

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44) If z is a non zero complex number, such that $2iz^2 = \bar{z}$ then $|z|$ is

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

45) The principal argument of $(\sin 40° + i\cos 40°)^5$ is

(1) $-110°$ (2) $-70°$ (3) $70°$ (4) $110°$

46) The principal argument of the complex number $\frac{\left(1+i\sqrt{3}\right)^2}{4i\left(1-i\sqrt{3}\right)}$ is

(1) $\frac{2\pi}{3}$ (2) $\frac{\pi}{6}$ (3) $\frac{5\pi}{6}$ (4) $\frac{\pi}{2}$

47) If $z = \frac{\left(\sqrt{3}+i\right)^3 (3i+4)^2}{(8+6i)^2}$, then $|z|$ is equal to

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

48) If $\omega \neq 1$ is a cubic root of unity and $\begin{vmatrix} 1 & 1 & 1 \\ 1 & -\omega^2-1 & \omega^2 \\ 1 & \omega^2 & \omega^7 \end{vmatrix} = 3k$, then k is equal to

(1) 1 (2) -1 (3) $\sqrt{3}i$ (4) $-\sqrt{3}i$

49) The conjugate of a complex number is $\frac{1}{i-2}$. Then, the complex number is

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

50) The area of the triangle formed by the complex numbers $z, iz,$ and $z+iz$ in the Argand's diagram is

(1) $\frac{1}{2}|z|^2$ (2) $|z|^2$ (3) $\frac{3}{2}|z|^2$ (4) $2|z|^2$

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51) The polynomial $x^3 - kx^2 + 9x$ has three real zeros if and only if, k satisfies

(1) $|k| \le 6$ (2) $k = 0$ (3) $|k| > 6$ (4) $|k| \ge 6$

52) According to the rational root theorem, which number is not possible rational zero of $4x^7 + 2x^4 - 10x^3 - 5$?

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

53) If α, β, and γ are the zeros of $x^3 + px^2 + qx + r$, then $\sum \frac{1}{\alpha}$ is

(1) $-\frac{q}{r}$ (2) $-\frac{p}{r}$ (3) $\frac{q}{r}$ (4) $-\frac{q}{p}$

54) The number of positive zeros of the polynomial $\sum_{j=0}^{n} {}^nC_r(-1)^r x^r$ is

(1) 0 (2) n (3) $< n$ (4) r

55) A zero of $x^3 + 64$ is

(1) 0 (2) 4 (3) $4i$ (4) -4

56) The number of real numbers in $[0, 2\pi]$ satisfying $\sin^4 x - 2\sin^2 x + 1$ is

(1) 2 (2) 4 (3) 1 (4) ∞

57) A polynomial equation in x of degree n always has

(1) n distinct roots (2) n real roots (3) n complex roots (4) at most one root.

58) If $x^3 + 12x^2 + 10ax + 1999$ definitely has a positive zero, if and only if

(1) $a \ge 0$ (2) $a > 0$ (3) $a < 0$ (4) $a \le 0$

59) If f and g are polynomials of degrees m and n respectively, and if $h(x) = (f \circ g)(x)$, then the degree of h is

(1) mn (2) $m + n$ (3) m^n (4) n^m

60) The polynomial $x^3 + 2x + 3$ has

(1) one negative and two imaginary zeros (2) one positive and two imaginary zeros

(3) three real zeros (4) no zeros

61) The value of $\sin^{-1}(\cos x)$, $0 \le x \le \pi$ is

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

62) If $\sin^{-1} x = 2\sin^{-1} \alpha$ has a solution, then

(1) $|\alpha| \le \frac{1}{\sqrt{2}}$ (2) $|\alpha| \ge \frac{1}{\sqrt{2}}$ (3) $|\alpha| < \frac{1}{\sqrt{2}}$ (4) $|\alpha| > \frac{1}{\sqrt{2}}$

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63) If $|x| \le 1$, then $2\tan^{-1} x - \sin^{-1}\frac{2x}{1+x^2}$ is equal to

(1) $\tan^{-1} x$ (2) $\sin^{-1} x$ (3) 0 (4) π

64) $\sin^{-1}\left(\tan\frac{\pi}{4}\right) - \sin^{-1}\left(\sqrt{\frac{3}{x}}\right) = \frac{\pi}{6}$. Then x is a root of the equation

(1) $x^2 - x - 6 = 0$ (2) $x^2 - x - 12 = 0$ (3) $x^2 + x - 12 = 0$ (4) $x^2 + x - 6 = 0$

65) $\tan^{-1}\left(\frac{1}{4}\right) + \tan^{-1}\left(\frac{2}{9}\right)$ is equal to

(1) $\frac{1}{2}\cos^{-1}\left(\frac{3}{5}\right)$ (2) $\frac{1}{2}\sin^{-1}\left(\frac{3}{5}\right)$ (3) $\frac{1}{2}\tan^{-1}\left(\frac{3}{5}\right)$ (4) $\tan^{-1}\left(\frac{1}{2}\right)$

66) If $\cot^{-1}\left(\sqrt{\sin\alpha}\right) + \tan^{-1}\left(\sqrt{\sin\alpha}\right) = u$, then $\cos 2u$ is equal to

(1) $\tan^2\alpha$ (2) 0 (3) -1 (4) $\tan 2\alpha$

67) $\sin(\tan^{-1} x), |x| < 1$ is equal to

(1) $\frac{x}{\sqrt{1-x^2}}$ (2) $\frac{1}{\sqrt{1-x^2}}$ (3) $\frac{1}{\sqrt{1+x^2}}$ (4) $\frac{x}{\sqrt{1+x^2}}$

68) $\sin^{-1}\left(2\cos^2 x - 1\right) + \cos^{-1}\left(1 - 2\sin^2 x\right) =$

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

69) If $\cot^{-1} 2$ and $\cot^{-1} 3$ are two angles of a triangle, then the third angle is

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

70) If $\sin^{-1} x + \cot^{-1}\left(\frac{1}{2}\right) = \frac{\pi}{2}$, then x is equal to

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

71) $\sin^{-1}(\cos x) = \frac{\pi}{2} - x$ is valid for

(1) $-\pi \le x \le 0$ (2) $0 \le x \le \pi$ (3) $-\frac{\pi}{2} \le x \le \frac{\pi}{2}$ (4) $-\frac{\pi}{4} \le x \le \frac{3\pi}{4}$

72) If the function $f(x) = \sin^{-1}\left(x^2 - 3\right)$, then x belongs to

(1) $[-1, 1]$ (2) $\left[\sqrt{2}, 2\right]$
(3) $\left[-2, -\sqrt{2}\right] \cup \left[\sqrt{2}, 2\right]$ (4) $\left[-2, -\sqrt{2}\right]$

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73) The equation $\tan^{-1} x - \cot^{-1} x = \tan^{-1}\left(\frac{1}{\sqrt{3}}\right)$ has

(1) no solution (2) unique solution
(3) two solutions (4) infinite number of solutions

74) If $\sin^{-1}\frac{x}{5} + \operatorname{cosec}^{-1}\frac{5}{4} = \frac{\pi}{2}$, then the value of x is

(1) 4 (2) 5 (3) 2 (4) 3

75) If $\sin^{-1} x + \sin^{-1} y = \frac{2\pi}{3}$; then $\cos^{-1} x + \cos^{-1} y$ is equal to

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

76) If $x = \frac{1}{5}$, the value of $\cos\left(\cos^{-1} x + 2\sin^{-1} x\right)$ is

(1) $-\sqrt{\frac{24}{25}}$ (2) $\sqrt{\frac{24}{25}}$ (3) $\frac{1}{5}$ (4) $-\frac{1}{5}$

77) $\sin^{-1}\frac{3}{5} - \cos^{-1}\frac{12}{13} + \sec^{-1}\frac{5}{3} - \operatorname{cosec}^{-1}\frac{13}{12}$ is equal to

(1) 2π (2) π (3) 0 (4) $\tan^{-1}\frac{12}{65}$

78) The domain of the function defined by $f(x) = \sin^{-1}\sqrt{x-1}$ is

(1) $[1, 2]$ (2) $[-1, 1]$ (3) $[0, 1]$ (4) $[-1, 0]$

79) If $\sin^{-1} x + \sin^{-1} y + \sin^{-1} z = \frac{3\pi}{2}$, the value of $x^{2017} + y^{2018} + z^{2019} - \frac{9}{x^{101} + y^{101} + z^{101}}$ is

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

80) If $\cot^{-1} x = \frac{2\pi}{5}$ for some $x \in R$, the value of $\tan^{-1} x$ is

(1) $-\frac{\pi}{10}$ (2) $\frac{\pi}{5}$ (3) $\frac{\pi}{10}$ (4) $-\frac{\pi}{5}$

81) The eccentricity of the hyperbola whose latus rectum is 8 and conjugate axis is equal to half the distance between the foci is

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

82) If $P(x, y)$ be any point on $16x^2 + 25y^2 = 400$ with foci $F_1(3,0)$ and $F_2(-3,0)$ then $PF_1 + PF_2$ is

(1) 8 (2) 6 (3) 10 (4) 12

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83) Tangents are drawn to the hyperbola $\frac{x^2}{9}-\frac{y^2}{4}=1$ parallel to the straight line $2x-y=1$. One of the points of contact of tangents on the hyperbola is

(1) $\left(\frac{9}{2\sqrt{2}},\frac{-1}{\sqrt{2}}\right)$ (2) $\left(\frac{-9}{2\sqrt{2}},\frac{1}{\sqrt{2}}\right)$ (3) $\left(\frac{9}{2\sqrt{2}},\frac{1}{\sqrt{2}}\right)$ (4) $\left(3\sqrt{3},-2\sqrt{2}\right)$

84) Area of the greatest rectangle inscribed in the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ is

(1) $2ab$ (2) ab (3) $\sqrt{ab}$ (4) $\frac{a}{b}$

85) If the normals of the parabola $y^2=4x$ drawn at the end points of its latus rectum are tangents to the circle $(x-3)^2+(y+2)^2=r^2$, then the value of r^2 is

(1) 2 (2) 3 (3) 1 (4) 4

86) The radius of the circle $3x^2+by^2+4bx-6by+b^2=0$ is

(1) 1 (2) 3 (3) $\sqrt{10}$ (4) $\sqrt{11}$

87) If $x+y=k$ is a normal to the parabola $y^2=12x$, then the value of k is

(1) 3 (2) -1 (3) 1 (4) 9

88) Consider an ellipse whose centre is of the origin and its major axis is along x-axis. If its eccentrcity is $\frac{3}{5}$ and the distance between its foci is 6, then the area of the quadrilateral inscribed in the ellipse with diagonals as major and minor axis of the ellipse is

(1) 8 (2) 32 (3) 80 (4) 40

89) The equation of the circle passing through $(1,5)$ and $(4,1)$ and touching y-axis is $x^2+y^2-5x-6y+9+\lambda(4x+3y-19)=0$ where λ is equal to

(1) $0,-\frac{40}{9}$ (2) 0 (3) $\frac{40}{9}$ (4) $\frac{-40}{9}$

90) The area of quadrilateral formed with foci of the hyperbolas $\frac{x^2}{a^2}-\frac{y^2}{b^2}=1$ and $\frac{x^2}{a^2}-\frac{y^2}{b^2}=-1$ is

(1) $4(a^2+b^2)$ (2) $2(a^2+b^2)$ (3) a^2+b^2 (4) $\frac{1}{2}(a^2+b^2)$

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91) The eccentricity of the ellipse $(x-3)^2+(y-4)^2=\frac{y^2}{9}$ is

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

92) The equation of the circle passing through the foci of the ellipse $\frac{x^2}{16}+\frac{y^2}{9}=1$ having centre at $(0,3)$ is

(1) $x^2+y^2-6y-7=0$ (2) $x^2+y^2-6y+7=0$

(3) $x^2+y^2-6y-5=0$ (4) $x^2+y^2-6y+5=0$

93) The length of the diameter of the circle which touches the x-axis at the point (1,0) and passes through the point $(2,3)$.

(1) $\frac{6}{5}$ (2) $\frac{5}{3}$ (3) $\frac{10}{3}$ (4) $\frac{3}{5}$

94) The ellipse E_1 : $\frac{x^2}{9}+\frac{y^2}{4}=1$ is inscribed in a rectangle R whose sides are parallel to the coordinate axes. Another ellipse E_2 passing through the point $(0,4)$ circumscribes the rectangle R. The eccentricity of the ellipse is

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

95) Let C be the circle with centre at $(1,1)$ and radius $=1$. If T is the circle centered at $(0,y)$ passing through the origin and touching the circle C externally, then the radius of T is equal to

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

96) If the coordinates at one end of a diameter of the circle $x^2+y^2-8x-4y+c=0$ are $(11,2)$, the coordinates of the other end are

(1) $(-5,2)$ (2) $(-3,2)$ (3) $(5,-2)$ (4) $(-2,5)$

97) The circle $x^2+y^2=4x+8y+5$ intersects the line $3x-4y=m$ at two distinct points if

(1) $15<m<65$ (2) $35<m<85$ (3) $-85<m<-35$ (4) $-35<m<15$

98) If the two tangents drawn from a point P to the parabola $y^2=4x$ are at right angles then the locus of P is

(1) $2x+1=0$ (2) $x=-1$ (3) $2x-1=0$ (4) $x=1$

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99) The centre of the circle inscribed in a square formed by the lines $x^2-8x-12=0$ and $y^2-14y+45=0$ is

(1) $(4,7)$ (2) $(7,4)$ (3) $(9,4)$ (4) $(4,9)$

100) The radius of the circle passing through the point $(6,2)$ two of whose diameter are $x+y=6$ and $x+2y=4$ is

(1) 10 (2) $2\sqrt{5}$ (3) 6 (4) 4

101) The values of m for which the line $y=mx+2\sqrt{5}$ touches the hyperbola $16x^2-9y^2=144$ are the roots of $x^2-(a+b)x-4=0$, then the value of $(a+b)$ is

(1) 2 (2) 4 (3) 0 (4) -2

102) An ellipse has OB as semi minor axes, F and F' its foci and the angle FBF' is a right angle. Then the eccentricity of the ellipse is

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

103) The locus of a point whose distance from $(-2,0)$ is $\frac{2}{3}$ times its distance from the line $x=\frac{-9}{2}$ is

(1) a parabola (2) a hyperbola (3) an ellipse (4) a circle

104) The equation of the normal to the circle $x^2+y^2-2x-2y+1=0$ which is parallel to the line $2x+4y=3$ is

(1) $x+2y=3$ (2) $x+2y+3=0$ (3) $2x+4y+3=0$ (4) $x-2y+3=0$

105) The circle passing through $(1,-2)$ and touching the axis of x at $(3,0)$ passing through the point

(1) $(-5,2)$ (2) $(2,-5)$ (3) $(5,-2)$ (4) $(-2,5)$

106) If $[\vec{a},\vec{b},\vec{c}]=1$, then the value of $\frac{\vec{a}\cdot(\vec{b}\times\vec{c})}{(\vec{c}\times\vec{a})\cdot\vec{b}}+\frac{\vec{b}\cdot(\vec{c}\times\vec{a})}{(\vec{a}\times\vec{b})\cdot\vec{c}}+\frac{\vec{c}\cdot(\vec{a}\times\vec{b})}{(\vec{c}\times\vec{b})\cdot\vec{a}}$ is

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

107) If $\vec{a},\vec{b},\vec{c}$ are non-coplanar, non-zero vectors such that $[\vec{a},\vec{b},\vec{c}]=3$, then $\{[\vec{a}\times\vec{b},\ \vec{b}\times\vec{c},\ \vec{c}\times\vec{a}]\}^2$ is equal to

(1) 81 (2) 9 (3) 27 (4) 18

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108) The coordinates of the point where the line $\vec{r}=(6\hat{i}-\hat{j}-3\hat{k})+t(-\hat{i}+4\hat{k})$ meets the plane $\vec{r}.(\hat{i}+\hat{j}-\hat{k})=3$ are

(1) $(2,1,0)$ (2) $(7,-1,-7)$ (3) $(1,2,-6)$ (4) $(5,-1,1)$

109) If the length of the perpendicular from the origin to the plane $2x+3y+\lambda z=1$, $\lambda>0$ is $\frac{1}{5}$, then the value of λ is

(1) $2\sqrt{3}$ (2) $3\sqrt{2}$ (3) 0 (4) 1

110) If the line $\frac{x-2}{3}=\frac{y-1}{-5}=\frac{z+2}{2}$ lies in the plane $x+3y-\alpha z+\beta=0$, then (α,β) is

(1) $(-5,5)$ (2) $(-6,7)$ (3) $(5,-5)$ (4) $(6,-7)$

111) If $\vec{a}$ and $\vec{b}$ are unit vectors such that $[\vec{a}, \vec{b}, \vec{a}\times\vec{b}]=\frac{1}{4}$, then the angle between $\vec{a}$ and $\vec{b}$ is

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

112) If $\vec{a},\vec{b},\vec{c}$ are three unit vectors such that $\vec{a}$ is perpendicular to $\vec{b}$, and is parallel to $\vec{c}$ then $\vec{a}\times(\vec{b}\times\vec{c})$ is equal to

(1) $\vec{a}$ (2) $\vec{b}$ (3) $\vec{c}$ (4) $\vec{0}$

113) If $\vec{a},\vec{b},\vec{c}$ are three non-coplanar unit vectors such that $\vec{a}\times(\vec{b}\times\vec{c})=\frac{\vec{b}+\vec{c}}{\sqrt{2}}$, then the angle between $\vec{a}$ and $\vec{b}$ is

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

114) Distance from the origin to the plane $3x-6y+2z+7=0$ is

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

115) The angle between the line $\vec{r}=(\hat{i}+2\hat{j}-3\hat{k})+t(2\hat{i}+\hat{j}-2\hat{k})$ and the plane $\vec{r}\cdot(\hat{i}+\hat{j})+4=0$ is

(1) $0°$ (2) $30°$ (3) $45°$ (4) $90°$

116) If the planes $\vec{r}.(2\hat{i}-\lambda\hat{j}+\hat{k})=3$ and $\vec{r}.(4\hat{i}+\hat{j}-\mu\hat{k})=5$ are parallel, then the value of λ and μ are

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

117) The angle between the lines $\frac{x-2}{3}=\frac{y+1}{-2}, z=2$ and $\frac{x-1}{1}=\frac{2y+3}{3}=\frac{z+5}{2}$ is

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

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118) If $\vec{a}=\hat{i}+\hat{j}+\hat{k},\ \vec{b}=\hat{i}+\hat{j},\ \vec{c}=\hat{i}$ and $(\vec{a}\times\vec{b})\times\vec{c}=\lambda\vec{a}+\mu\vec{b}$, then the value of $\lambda+\mu$ is

(1) 0 (2) 1 (3) 6 (4) 3

119) If $\vec{a}\cdot\vec{b}=\vec{b}\cdot\vec{c}=\vec{c}\cdot\vec{a}=0$, then the value of $[\vec{a},\vec{b},\vec{c}]$ is

(1) $|\vec{a}|\,|\vec{b}|\,|\vec{c}|$ (2) $\frac{1}{3}|\vec{a}|\,|\vec{b}|\,|\vec{c}|$ (3) 1 (4) -1

120) Consider the vectors $\vec{a},\vec{b},\vec{c},\vec{d}$ such that $(\vec{a}\times\vec{b})\times(\vec{c}\times\vec{d})=\vec{0}$. Let P_1 and P_2 be the planes determined by the pairs of vectors $\vec{a},\vec{b}$ and $\vec{c},\vec{d}$ respectively. Then the angle between P_1 and P_2 is

(1) $0°$ (2) $45°$ (3) $60°$ (4) $90°$

121) The distance between the planes $x+2y+3z+7=0$ and $2x+4y+6z+7=0$ is

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

122) If $\vec{a}$ and $\vec{b}$ are parallel vectors, then $[\vec{a},\vec{c},\vec{b}]$ is equal to

(1) 2 (2) -1 (3) 1 (4) 0

123) If the volume of the parallelepiped with $\vec{a}\times\vec{b},\ \vec{b}\times\vec{c},\ \vec{c}\times\vec{a}$ as coterminous edges is 8 cubic units, then the volume of the parallelepiped with $(\vec{a}\times\vec{b})\times(\vec{b}\times\vec{c}),(\vec{b}\times\vec{c})\times(\vec{c}\times\vec{a})$ and $(\vec{c}\times\vec{a})\times(\vec{a}\times\vec{b})$ as coterminous edges is,

(1) 8 cubic units (2) 512 cubic units (3) 64 cubic units (4) 24 cubic units

124) The vector equation $\vec{r}=(\hat{i}-2\hat{j}-\hat{k})+t(6\hat{j}-\hat{k})$ represents a straight line passing through the points

(1) $(0,6,-1)$ and $(1,-2,-1)$ (2) $(0,6,-1)$ and $(-1,-4,-2)$

(3) $(1,-2,-1)$ and $(1,4,-2)$ (4) $(1,-2,-1)$ and $(0,-6,1)$

125) If $\vec{a}\times(\vec{b}\times\vec{c})=(\vec{a}\times\vec{b})\times\vec{c}$, where $\vec{a},\vec{b},\vec{c}$ are any three vectors such that $\vec{b}\cdot\vec{c}\neq 0$ and $\vec{a}\cdot\vec{b}\neq 0$, then $\vec{a}$ and $\vec{c}$ are

(1) perpendicular (2) parallel

(3) inclined at an angle $\frac{\pi}{3}$ (4) inclined at an angle $\frac{\pi}{6}$

126) The volume of the parallelepiped with its edges represented by the vectors $\hat{i}+\hat{j},\ \hat{i}+2\hat{j},\ \hat{i}+\hat{j}+\pi\hat{k}$ is

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

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127) If $\vec{a}=2\hat{i}+3\hat{j}-\hat{k}$, $\vec{b}=\hat{i}+2\hat{j}-5\hat{k}$, $\vec{c}=3\hat{i}+5\hat{j}-\hat{k}$, then a vector perpendicular to $\vec{a}$ and lies in the plane containing $\vec{b}$ and $\vec{c}$ is

(1) $-17\hat{i}+21\hat{j}-97\hat{k}$ (2) $17\hat{i}+21\hat{j}-123\hat{k}$

(3) $-17\hat{i}-21\hat{j}+97\hat{k}$ (4) $-17\hat{i}-21\hat{j}-97\hat{k}$

128) If the distance of the point $(1,1,1)$ from the origin is half of its distance from the plane $x+y+z+k=0$, then the values of k are

(1) ± 3 (2) ± 6 (3) $-3,9$ (4) $3,-9$

129) If a vector $\vec{\alpha}$ lies in the plane of $\vec{\beta}$ and $\vec{\gamma}$, then

(1) $[\vec{\alpha},\vec{\beta},\vec{\gamma}]=1$ (2) $[\vec{\alpha},\vec{\beta},\vec{\gamma}]=-1$ (3) $[\vec{\alpha},\vec{\beta},\vec{\gamma}]=0$ (4) $[\vec{\alpha},\vec{\beta},\vec{\gamma}]=2$

130) If the direction cosines of a line are $\frac{1}{c},\frac{1}{c},\frac{1}{c}$, then

(1) $c=\pm 3$ (2) $c=\pm\sqrt{3}$ (3) $c>0$ (4) $0<c<1$

131) A balloon rises straight up at 10 m/s. An observer is 40 m away from the spot where the balloon left the ground. The rate of change of the balloon's angle of elevation in radian per second when the balloon is 30 metres above the ground.

(1) $\frac{3}{25}$ radians/sec (2) $\frac{4}{25}$ radians/sec (3) $\frac{1}{5}$ radians/sec (4) $\frac{1}{3}$ radians/sec

132) The value of the limit $\lim_{x\to 0}\left(\cot x-\frac{1}{x}\right)$ is

(1) 0 (2) 1 (3) 2 (4) ∞

133) One of the closest points on the curve $x^2-y^2=4$ to the point $(6,0)$ is

(1) $(2,0)$ (2) $(\sqrt{5},1)$ (3) $(3,\sqrt{5})$ (4) $(\sqrt{13},-\sqrt{3})$

134) The function $\sin^4 x+\cos^4 x$ is increasing in the interval

(1) $\left[\frac{5\pi}{8},\frac{3\pi}{4}\right]$ (2) $\left[\frac{\pi}{2},\frac{5\pi}{8}\right]$ (3) $\left[\frac{\pi}{4},\frac{\pi}{2}\right]$ (4) $\left[0,\frac{\pi}{4}\right]$

135) A stone is thrown up vertically. The height it reaches at time t seconds is given by $x=80t-16t^2$. The stone reaches the maximum height in time t seconds is given by

(1) 2 (2) 2.5 (3) 3 (4) 3.5

136) Angle between $y^2 = x$ and $x^2 = y$ at the origin is

(1) $\tan^{-1}\frac{3}{4}$ (2) $\tan^{-1}\left(\frac{4}{3}\right)$ (3) $\frac{\pi}{2}$ (4) $\frac{\pi}{4}$

137) The minimum value of the function $|3-x|+9$ is

(1) 0 (2) 3 (3) 6 (4) 9

138) The point of inflection of the curve $y=(x-1)^3$ is

(1) $(0,0)$ (2) $(0,1)$ (3) $(1,0)$ (4) $(1,1)$

139) The tangent to the curve $y^2 - xy + 9 = 0$ is vertical when

(1) $y=0$ (2) $y=\pm\sqrt{3}$ (3) $y=\frac{1}{2}$ (4) $y=\pm 3$

140) The position of a particle moving along a horizontal line of any time t is given by $s(t)=3t^2-2t-8$. The time at which the particle is at rest is

(1) $t=0$ (2) $t=\frac{1}{3}$ (3) $t=1$ (4) $t=3$

141) The number given by the Mean value theorem for the function $\frac{1}{x}, x\in[1,9]$ is

(1) 2 (2) 2.5 (3) 3 (4) 3.5

142) The curve $y=ax^4+bx^2$ with $ab>0$

(1) has no horizontal tangent (2) is concave up

(3) is concave down (4) has no points of inflection

143) The slope of the line normal to the curve $f(x)=2\cos 4x$ at $x=\frac{\pi}{12}$ is

(1) $-4\sqrt{3}$ (2) -4 (3) $\frac{\sqrt{3}}{12}$ (4) $4\sqrt{3}$

144) The maximum slope of the tangent to the curve $y=e^x\sin x, x\in[0,2\pi]$ is at

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

145) The maximum value of the product of two positive numbers, when their sum of the squares is 200, is

(1) 100 (2) $25\sqrt{7}$ (3) 28 (4) $24\sqrt{14}$

146) The point on the curve $6y=x^3+2$ at which y-coordinate changes 8 times as fast as x-coordinate is

(1) $(4,11)$ (2) $(4,-11)$ (3) $(-4,11)$ (4) $(-4,-11)$

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147) The volume of a sphere is increasing in volume at the rate of $3\pi\,\text{cm}^3/\text{sec}$. The rate of change of its radius when radius is $\frac{1}{2}$ cm

(1) 3 cm/s (2) 2 cm/s (3) 1 cm/s (4) $\frac{1}{2}$ cm/s

148) The maximum value of the function $x^2e^{-2x}, x>0$ is

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

149) The abscissa of the point on the curve $f(x)=\sqrt{8-2x}$ at which the slope of the tangent is -0.25?

(1) -8 (2) -4 (3) -2 (4) 0

150) The number given by the Rolle's theorem for the function $x^3-3x^2, x\in[0,3]$ is

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

151) If $f(x)=\frac{x}{x+1}$, then its differential is given by

(1) $\frac{-1}{(x+1)^2}dx$ (2) $\frac{1}{(x+1)^2}dx$ (3) $\frac{1}{x+1}dx$ (4) $\frac{-1}{x+1}dx$

152) If $f(x,y,z)=xy+yz+zx$, then f_x-f_z is equal to

(1) $z-x$ (2) $y-z$ (3) $x-z$ (4) $y-x$

153) The change in the surface area $S=6x^2$ of a cube when the edge length varies from x_0 to x_0+dx is

(1) $12x_0+dx$ (2) $12x_0dx$ (3) $6x_0dx$ (4) $6x_0+dx$

154) If $v(x,y)=\log(e^x+e^y)$, then $\frac{\partial v}{\partial x}+\frac{\partial v}{\partial y}$ is equal to

(1) e^x+e^y (2) $\frac{1}{e^x+e^y}$ (3) 2 (4) 1

155) If $g(x,y)=3x^2-5y+2y^2, x(t)=e^t$ and $y(t)=\cos t$, then $\frac{dg}{dt}$ is equal to

(1) $6e^{2t}+5\sin t-4\cos t\sin t$ (2) $6e^{2t}-5\sin t+4\cos t\sin t$

(3) $3e^{2t}+5\sin t+4\cos t\sin t$ (4) $3e^{2t}-5\sin t+4\cos t\sin t$

156) If $w(x,y,z)=x^2(y-z)+y^2(z-x)+z^2(x-y)$, then $\frac{\partial w}{\partial x}+\frac{\partial w}{\partial y}+\frac{\partial w}{\partial z}$ is

(1) $xy+yz+zx$ (2) $x(y+z)$ (3) $y(z+x)$ (4) 0

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157) The approximate change in the volume V of a cube of side x metres caused by increasing the side by 1% is

(1) $0.3xdx\,m^3$ (2) $0.03x\,m^3$ (3) $0.03x^2m^3$ (4) $0.03x^3m^3$

158) A circular template has a radius of 10 cm. The measurement of radius has an approximate error of 0.02 cm. Then the percentage error in calculating area of this template is

(1) 0.2% (2) 0.4% (3) 0.04% (4) 0.08%

159) If $f(x,y)=e^{xy}$, then $\frac{\partial^2 f}{\partial x\partial y}$ is equal to

(1) xye^{xy} (2) $(1+xy)e^{xy}$ (3) $(1+y)e^{xy}$ (4) $(1+x)e^{xy}$

160) If $u(x,y)=x^2+3xy+y-2019$, then $\left.\frac{\partial u}{\partial x}\right|_{(4,-5)}$ is equal to

(1) -4 (2) -3 (3) -7 (4) 13

161) If we measure the side of a cube to be 4 cm with an error of 0.1 cm, then the error in our calculation of the volume is

(1) 0.4 cu.cm (2) 0.45 cu.cm (3) 2 cu.cm (4) 4.8 cu.cm

162) Linear approximation for $g(x)=\cos x$ at $x=\frac{\pi}{2}$ is

(1) $x+\frac{\pi}{2}$ (2) $-x+\frac{\pi}{2}$ (3) $x-\frac{\pi}{2}$ (4) $-x-\frac{\pi}{2}$

163) If $w(x,y)=x^y, x>0$, then $\frac{\partial w}{\partial x}$ is equal to

(1) $x^y\log x$ (2) $y\log x$ (3) yx^{y-1} (4) $x\log y$

164) If $u(x,y)=e^{x^2+y^2}$, then $\frac{\partial u}{\partial x}$ is equal to

(1) $e^{x^2+y^2}$ (2) $2xu$ (3) x^2u (4) y^2u

165) The percentage error of fifth root of 31 is approximately how many times the percentage error in 31?

(1) $\frac{1}{31}$ (2) $\frac{1}{5}$ (3) 5 (4) 31

166) The value of $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}}\sin^2 x\cos x\,dx$ is

(1) $\frac{3}{2}$ (2) $\frac{1}{2}$ (3) 0 (4) $\frac{2}{3}$

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167) The value of $\int_0^{\frac{\pi}{6}} \cos^3 3x \, dx$ is

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

168) The value of $\int_0^1 (\sin^{-1} x)^2 \, dx$ is

(1) $\frac{\pi^2}{4} - 1$ (2) $\frac{\pi^2}{4} + 2$ (3) $\frac{\pi^2}{4} + 1$ (4) $\frac{\pi^2}{4} - 2$

169) If $\frac{\Gamma(n+2)}{\Gamma(n)} = 90$ then n is

(1) 10 (2) 5 (3) 8 (4) 9

170) The value of $\int_{-1}^{2} |x| \, dx$ is

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

171) If $f(x) = \int_0^x t \cos t \, dt$, then $\frac{df}{dx} =$

(1) $\cos x - x \sin x$ (2) $\sin x + x \cos x$ (3) $x \cos x$ (4) $x \sin x$

172) If $\int_0^a \frac{1}{4+x^2} dx = \frac{\pi}{8}$ then a is

(1) 4 (2) 1 (3) 3 (4) 2

173) If $\int_0^x f(t)\,dt = x + \int_x^1 t f(t)\,dt$, then the value of $f(1)$ is

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

174) The value of $\int_0^{\pi} \frac{dx}{1+5^{\cos x}}$ is

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

175) For any value of $n \in \mathbb{Z}$, $\int_0^{\pi} e^{\cos^2 x} \cos^3 [(2n+1)x] \, dx$ is

(1) $\frac{\pi}{2}$ (2) π (3) 0 (4) 2

176) The value of $\int_0^a \left(\sqrt{a^2 - x^2}\right)^3 dx$ is

(1) $\frac{\pi a^3}{16}$ (2) $\frac{3\pi a^4}{16}$ (3) $\frac{3\pi a^2}{8}$ (4) $\frac{3\pi a^4}{8}$

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177) The value of $\int_0^1 x(1-x)^{99}\,dx$ is

(1) $\frac{1}{11000}$ (2) $\frac{1}{10100}$ (3) $\frac{1}{10010}$ (4) $\frac{1}{10001}$

178) The volume of solid of revolution of the region bounded by $y^2 = x(a-x)$ about x-axis is

(1) πa^3 (2) $\frac{\pi a^3}{4}$ (3) $\frac{\pi a^3}{5}$ (4) $\frac{\pi a^3}{6}$

179) The area between $y^2 = 4x$ and its latus rectum is

(1) $\frac{2}{3}$ (2) $\frac{4}{3}$ (3) $\frac{8}{3}$ (4) $\frac{5}{3}$

180) The value of $\int_0^{\frac{2}{3}} \frac{dx}{\sqrt{4-9x^2}}$ is

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

181) The value of $\int_{-\frac{\pi}{4}}^{\frac{\pi}{4}} \left(\frac{2x^7 - 3x^5 + 7x^3 - x + 1}{\cos^2 x}\right) dx$ is

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

182) The value of $\int_0^\infty e^{-3x} x^2 dx$ is

(1) $\frac{7}{27}$ (2) $\frac{5}{27}$ (3) $\frac{4}{27}$ (4) $\frac{2}{27}$

183) The value of $\int_{-4}^{4} \left[\tan^{-1}\left(\frac{x^2}{x^4+1}\right) + \tan^{-1}\left(\frac{x^4+1}{x^2}\right)\right] dx$ is

(1) π (2) 2π (3) 3π (4) 4π

184) The value of $\int_0^\pi \sin^4 x\, dx$ is

(1) $\frac{3\pi}{10}$ (2) $\frac{3\pi}{8}$ (3) $\frac{3\pi}{4}$ (4) $\frac{3\pi}{2}$

185) If $f(x) = \int_1^x \frac{e^{\sin u}}{u} du, x > 1$ and

$\int_1^3 \frac{e^{\sin x^2}}{x} dx = \frac{1}{2}[f(a) - f(1)]$, then one of the possible value of a is

(1) 3 (2) 6 (3) 9 (4) 5

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186) The order and degree of the differential equation $\frac{d^2y}{dx^2}+\left(\frac{dy}{dx}\right)^{1/3}+x^{1/4}=0$ are respectively

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

187) The number of arbitrary constants in the general solutions of order n and $n+1$ are respectively

(1) $n-1,\ n$ (2) $n,\ n+1$ (3) $n+1,\ n+2$ (4) $n+1,\ n$

188) The general solution of the differential equation $\frac{dy}{dx}=\frac{y}{x}$ is

(1) $xy=k$ (2) $y=k\log x$ (3) $y=kx$ (4) $\log y=kx$

189) The degree of the differential equation $y(x)=1+\frac{dy}{dx}+\frac{1}{1\cdot 2}\left(\frac{dy}{dx}\right)^2+\frac{1}{1\cdot 2\cdot 3}\left(\frac{dy}{dx}\right)^3+\ldots.$ is

(1) 2 (2) 3 (3) 1 (4) 4

190) The slope at any point of a curve $y=f(x)$ is given by $\frac{dy}{dx}=3x^2$ and it passes through (-1,1). Then the equation of the curve is

(1) $y=x^3+2$ (2) $y=3x^2+4$ (3) $y=3x^3+4$ (4) $y=x^3+5$

191) The solution of the differential equation $\frac{dy}{dx}=\frac{y}{x}+\frac{\phi\left(\frac{y}{x}\right)}{\phi'\left(\frac{y}{x}\right)}$ is

(1) $x\phi\left(\frac{y}{x}\right)=k$ (2) $\phi\left(\frac{y}{x}\right)=kx$ (3) $y\phi\left(\frac{y}{x}\right)=k$ (4) $\phi\left(\frac{y}{x}\right)=ky$

192) The solution of $\frac{dy}{dx}+p(x)y=0$ is

(1) $y=ce^{\int pdx}$ (2) $y=ce^{-\int pdx}$ (3) $x=ce^{-\int pdy}$ (4) $x=ce^{\int pdy}$

193) The solution of the differential equation $\frac{dy}{dx}+\frac{1}{\sqrt{1-x^2}}=0$ is

(1) $y+\sin^{-1}x=c$ (2) $x+\sin^{-1}y=0$ (3) $y^2+2\sin^{-1}x=C$ (4) $x^2+2\sin^{-1}y=0$

194) The number of arbitrary constants in the particular solution of a differential equation of third order is

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

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195) P is the amount of certain substance left in after time t. If the rate of evaporation of the substance is proportional to the amount remaining, then

(1) $P = Ce^{kt}$ (2) $P = Ce^{-kt}$ (3) $P = Ckt$ (4) $Pt = C$

196) The order and degree of the differential equation $\sqrt{\sin x}\,(dx+dy) = \sqrt{\cos x}\,(dx-dy)$ is

(1) 1, 2 (2) 2, 2 (3) 1, 1 (4) 2, 1

197) If p and q are the order and degree of the differential equation $y\frac{dy}{dx} + x^3\left(\frac{d^2y}{dx^2}\right) + xy = \cos x$, when

(1) $p < q$ (2) $p = q$ (3) $p > q$ (4) p exists and q does not exist

198) The population P in any year t is such that the rate of increase in the population is proportional to the population. Then

(1) $P = Ce^{kt}$ (2) $P = Ce^{-kt}$ (3) $P = Ckt$ (4) $P = C$

199) The integrating factor of the differential equation $\frac{dy}{dx} + y = \frac{1+y}{\lambda}$ is

(1) $\frac{x}{e^{\lambda}}$ (2) $\frac{e^{\lambda}}{x}$ (3) λe^{x} (4) e^{x}

200) If the solution of the differential equation $\frac{dy}{dx} = \frac{ax+3}{2y+f}$ represents a circle, then the value of a is

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

201) The differential equation representing the family of curves $y = A\cos(x+B)$, where A and B are parameters, is

(1) $\frac{d^2y}{dx^2} - y = 0$ (2) $\frac{d^2y}{dx^2} + y = 0$ (3) $\frac{d^2y}{dx^2} = 0$ (4) $\frac{d^2x}{dy^2} = 0$

202) The order of the differential equation of all circles with centre at (h, k) and radius 'a' is

(1) 2 (2) 3 (3) 4 (4) 1

203) The solution of the differential equation $\frac{dy}{dx} = 2xy$ is

(1) $y = Ce^{x^2}$ (2) $y = 2x^2 + C$ (3) $y = Ce^{-x^2} + C$ (4) $y = x^2 + C$

204) Integrating factor of the differential equation $\frac{dy}{dx} = \frac{x+y+1}{x+1}$ is

(1) $\frac{1}{x+1}$ (2) $x+1$ (3) $\frac{1}{\sqrt{x+1}}$ (4) $\sqrt{x+1}$

205) The solution of $\frac{dy}{dx} = 2^{y-x}$ is

(1) $2^x + 2^y = C$ (2) $2^x - 2^y = C$ (3) $\frac{1}{2^x} - \frac{1}{2^y} = C$ (4) $x + y = C$

206) The differential equation of the family of curves $y = Ae^x + Be^{-x}$, where A and B are arbitrary constants is

(1) $\frac{d^2y}{dx^2} + y = 0$ (2) $\frac{d^2y}{dx^2} - y = 0$ (3) $\frac{dy}{dx} + y = 0$ (4) $\frac{dy}{dx} - y = 0$

207) The general solution of the differential equation $\log\left(\frac{dy}{dx}\right) = x + y$ is

(1) $e^x + e^y = C$ (2) $e^x + e^{-y} = C$ (3) $e^{-x} + e^y = C$ (4) $e^{-x} + e^{-y} = C$

208) The integrating factor of the differential equation $\frac{dy}{dx} + P(x)y = Q(x)$ is x, then $P(x)$

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

209) The solution of the differential equation $2x\frac{dy}{dx} - y = 3$ represents

(1) straight lines (2) circles (3) parabola (4) ellipse

210) If $\sin x$ is the integrating factor of the linear differential equation $\frac{dy}{dx} + Py = Q$, then P is

(1) $\log \sin x$ (2) $\cos x$ (3) $\tan x$ (4) $\cot x$

211) Four buses carrying 160 students from the same school arrive at a football stadium. The buses carry, respectively, 42, 36, 34, and 48 students. One of the students is randomly selected. Let X denote the number of students that were on the bus carrying the randomly selected student. One of the 4 bus drivers is also randomly selected. Let Y denote the number of students on that bus.
Then $E(X)$ and $E(Y)$ respectively are

(1) 50, 40 (2) 40, 50 (3) 40.75, 40 (4) 41, 41

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212) A rod of length $2l$ is broken into two pieces at random. The probability density function of the shorter of the two pieces is

$$f(x)=\begin{cases}\frac{1}{l} & 0<x<l\\ 0 & l\le x<2l\end{cases}$$

The mean and variance of the shorter of the two pieces are respectively

(1) $\frac{l}{2},\ \frac{l^2}{3}$ (2) $\frac{l}{2},\ \frac{l^2}{6}$ (3) $l,\ \frac{l^2}{12}$ (4) $\frac{l}{2},\ \frac{l^2}{12}$

213) A computer salesperson knows from his past experience that he sells computers to one in every twenty customers who enter the showroom. What is the probability that he will sell a computer to exactly two of the next three customers?

(1) $\frac{57}{20^3}$ (2) $\frac{57}{20^2}$ (3) $\frac{19^3}{20^3}$ (4) $\frac{57}{20}$

214) Which of the following is a discrete random variable?
I. The number of cars crossing a particular signal in a day.
II. The number of customers in a queue to buy train tickets at a moment.
III. The time taken to complete a telephone call.

(1) I and II (2) II only (3) III only (4) II and III

215) Let X be random variable with probability density function

$$f(x)=\begin{cases}\frac{2}{x^3} & x\ge 1\\ 0 & x<1\end{cases}$$

Which of the following statement is correct?

(1) both mean and variance exist (2) mean exists but variance does not exist
(3) both mean and variance do not exist (4) variance exists but Mean does not exist.

216) If the function $f(x)=\frac{1}{12}$ for $a<x<b$, represents a probability density function of a continuous random variable X, then which of the following cannot be the value of a and b?

(1) 0 and 12 (2) 5 and 17 (3) 7 and 19 (4) 16 and 24

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217) If X is a binomial random variable with expected value 6 and variance 2.4, then $P(X = 5)$ is

(1) $\binom{10}{5}\left(\frac{3}{5}\right)^6\left(\frac{2}{5}\right)^4$ (2) $\binom{10}{5}\left(\frac{3}{5}\right)^{10}$

(3) $\binom{10}{5}\left(\frac{3}{5}\right)^4\left(\frac{2}{5}\right)^6$ (4) $\binom{10}{5}\left(\frac{3}{5}\right)^5\left(\frac{2}{5}\right)^5$

218) Two coins are to be flipped. The first coin will land on heads with probability 0.6, the second with Probability 0.5. Assume that the results of the flips are independent, and let X equal the total number of heads that result. The value of $E(X)$ is

(1) 0.11 (2) 1.1 (3) 11 (4) 1

219) Consider a game where the player tosses a six-sided fair die. If the face that comes up is 6, the player wins ₹ 36, otherwise he loses ₹ k^2, where k is the face that comes up $k = \{1, 2, 3, 4, 5\}$.

The expected amount to win at this game in ₹ is

(1) $\frac{19}{6}$ (2) $-\frac{19}{6}$ (3) $\frac{3}{2}$ (4) $-\frac{3}{2}$

220) If in 6 trials, X is a binomial variable which follows the relation $9P(X=4) = P(X=2)$, then the probability of success is

(1)0.125 (2) 0.25 (3) 0.375 (4) 0.75

221) Suppose that X takes on one of the values 0, 1, and 2. If for some constant k,

$P(X=i) = k\,P(X=i-1)$ for $i = 1, 2$ and $P(X=0) = \frac{1}{7}$, then the value of k is

(1) 1 (2) 2 (3) 3 (4) 4

222) A pair of dice numbered 1, 2, 3, 4, 5, 6 of a six-sided die and 1, 2, 3, 4 of a four-sided die is rolled and the sum is determined. Let the random variable X denote this sum. Then the number of elements in the inverse image of 7 is

(1) 1 (2) 2 (3) 3 (4) 4

223) Let X have a Bernoulli distribution with mean 0.4, then the variance of $(2X-3)$ is

(1) 0.24 b) 0.48 (3) 0.6 (4) 0.96

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224) The random variable X has the probability density function

$$f(x)=\begin{cases} ax+b & 0<x<1 \\ 0 & \text{otherwise} \end{cases}$$

and $E(X)=\frac{7}{12}$, then a and b are respectively

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

225) On a multiple-choice exam with 3 possible destructives for each of the 5 questions, the probability that a student will get 4 or more correct answers just by guessing is

(1) $\frac{11}{243}$ (2) $\frac{3}{8}$ (3) $\frac{1}{243}$ (4) $\frac{5}{243}$

226) The probability mass function of a random variable is defined as:

x	-2	-1	0	1	2
$f(x)$	k	$2k$	$3k$	$4k$	$5k$

Then $E(X)$ is equal to:

(1) $\frac{1}{15}$ (2) $\frac{1}{10}$ (3) $\frac{1}{3}$ (4) $\frac{2}{3}$

227) If $P(X=0)=1-P(X=1)$. If $E(X)=3\text{Var}(X)$, then $P(X=0)$ is

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

228) A random variable X has binomial distribution with $n=25$ and $p=0.8$ then standard deviation of X is

(1) 6 (2) 4 (3) 3 (4) 2

229) Let X represent the difference between the number of heads and the number of tails obtained when a coin is tossed n times. Then the possible values of X are

(1) $i+2n,\ i=0,1,2\ldots n$ (2) $2i-n,\ i=0,1,2\ldots n$ (3) $n-i,\ i=0,1,2\ldots n$ (4) $2i+2n,\ i=0,1,2\ldots n$

230) If $f(x)=\begin{cases} 2x & 0\le x\le a \\ 0 & \text{otherwise} \end{cases}$ is a probability density function of a random variable, then the value of a is

(1) 1 (2) 2 (3) 3 (4) 4

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231) Determine the truth value of each of the following statements:

(a) $4+2=5$ and $6+3=9$ (b) $3+2=5$ and $6+1=7$

(c) $4+5=9$ and $1+2=4$ (d) $3+2=5$ and $4+7=11$

	(a)	(b)	(c)	(d)
(1)	F	T	F	T
(2)	T	F	T	F
(3)	T	T	F	F
(4)	F	F	T	T

232) Which one is the contrapositive of the statement $(p \vee q) \rightarrow r$?

(1) $\neg r \rightarrow (\neg p \wedge \neg q)$ (2) $\neg r \rightarrow (p \vee q)$

(3) $r \rightarrow (p \wedge q)$ (4) $p \rightarrow (q \vee r)$

233) If $a * b = \sqrt{a^2 + b^2}$ on the real numbers then $*$ is

(1) commutative but not associative (2) associative but not commutative

(3) both commutative and associative (4) neither commutative nor associative

234) Which one of the following statements has truth value F?

(1) Chennai is in India or $\sqrt{2}$ is an integer

(2) Chennai is in India or $\sqrt{2}$ is an irrational number

(3) Chennai is in China or $\sqrt{2}$ is an integer

(4) Chennai is in China or $\sqrt{2}$ is an irrational number

235) The dual of $\neg (p \vee q) \vee [p \vee (p \wedge \neg r)]$ is

(1) $\neg (p \wedge q) \wedge [p \vee (p \wedge \neg r)]$ (2) $(p \wedge q) \wedge [p \wedge (p \vee \neg r)]$

(3) $\neg (p \wedge q) \wedge [p \wedge (p \wedge r)]$ (4) $\neg (p \wedge q) \wedge [p \wedge (p \vee \neg r)]$

236) Which one of the following is not true?

(1) Negation of a negation of a statement is the statement itself.

(2) If the last column of the truth table contains only T then it is a tautology.

(3) If the last column of its truth table contains only F then it is a contradiction

(4) If p and q are any two statements then $p \leftrightarrow q$ is a tautology.

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237) The truth table for $(p \wedge q) \vee \neg q$ is given below

p	q	$(p \wedge q) \vee (\neg q)$
T	T	(a)
T	F	(b)
F	T	(c)
F	F	(d)

Which one of the following is true?

	(a)	(b)	(c)	(d)
(1)	T	T	T	T
(2)	T	F	T	T
(3)	T	T	F	T
(4)	T	F	F	F

238) Which one of the following statements has the truth value T?

(1) $\sin x$ is an even function.

(2) Every square matrix is non-singular

(3) The product of complex number and its conjugate is purely imaginary

(4) $\sqrt{5}$ is an irrational number

239) In the set $\mathbb{R}$ of real numbers '$*$' is defined as follows. Which one of the following is not a binary operation on $\mathbb{R}$?

(1) $a * b = \min(a \cdot b)$ (2) $a * b = \max(a, b)$

(3) $a * b = a$ (4) $a * b = a^b$

240) If a compound statement involves 3 simple statements, then the number of rows in the truth table is

(1) 9 (2) 8 (3) 6 (4) 3

241) The proposition $p \wedge (\neg p \vee q)$ is

(1) a tautology (2) a contradiction

(3) logically equivalent to $p \wedge q$ (4) logically equivalent to $p \vee q$

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242) Which one of the following is correct for the truth value of $(p \wedge q) \rightarrow \neg p$?

p	q	$(p \wedge q) \rightarrow \neg p$
T	T	(a)
T	F	(b)
F	T	(c)
F	F	(d)

	(a)	(b)	(c)	(d)
(1)	T	T	T	T
(2)	F	T	T	T
(3)	F	F	T	T
(4)	T	T	T	F

243) Which one of the following is a binary operation on $\mathbb{N}$?

(1) Subtraction (2) Multiplication (3) Division (4) All the above

244) In the set $\mathbb{Q}$ define $a \odot b = a + b + ab$. For what value of y, $3 \odot (y \odot 5) = 7$?

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

245) Which one is the inverse of the statement $(p \vee q) \rightarrow (p \wedge q)$?

(1) $(p \wedge q) \rightarrow (p \vee q)$ (2) $\neg(p \vee q) \rightarrow (p \wedge q)$

(3) $(\neg p \vee \neg q) \rightarrow (\neg p \wedge \neg q)$ (4) $(\neg p \wedge \neg q) \rightarrow (\neg p \vee \neg q)$

246) Which one of the following is incorrect? For any two propositions p and q, we have

(1) $\neg(p \vee q) \equiv \neg p \wedge \neg q$ (2) $\neg(p \wedge q) \equiv \neg p \vee \neg q$

(3) $\neg(p \vee q) \equiv \neg p \vee \neg q$ (4) $\neg(\neg p) \equiv p$

247) Subtraction is not a binary operation in

(1) $\mathbb{R}$ (2) $\mathbb{Z}$ (3) $\mathbb{N}$ (4) $\mathbb{Q}$

248) In the last column of the truth table for $\neg(p \vee \neg q)$ the number of final outcomes of the truth value 'F' are

(1) 1 (2) 2 (3) 3 (4) 4

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249) The operation $*$ defined by $a*b=\frac{ab}{7}$ is not a binary operation on

(1) $\mathbb{Q}^+$ (2) $\mathbb{Z}$ (3) $\mathbb{R}$ (4) $\mathbb{C}$

250) A binary operation on a set S is a function from

(1) $S\to S$ (2) $(S\times S)\to S$ (3) $S\to(S\times S)$ (4) $(S\times S)\to(S\times S)$

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ANSWER CODE SHEET FOR ONE MARK QUESTION

CLASS – XII – MATHEMATICS

Qn No	Ans Code	Qn No	Ans Code	Qn No	Ans Code	Qn No	Ans Code	Qn No	Ans Code	Qn No	Ans Code	Qn No	Ans Code	Qn No	Ans Code	Qn No	Ans Code	Qn No	Ans Code
1	2	26	1	51	4	76	4	101	3	126	3	151	2	176	2	201	2	226	4
2	2	27	2	52	3	77	3	102	1	127	4	152	1	177	2	202	2	227	4
3	4	28	1	53	1	78	1	103	3	128	4	153	2	178	4	203	1	228	4
4	1	29	1	54	2	79	1	104	1	129	3	154	4	179	3	204	1	229	2
5	2	30	4	55	4	80	3	105	3	130	2	155	1	180	1	205	3	230	1
6	4	31	1	56	1	81	3	106	1	131	2	156	4	181	3	206	2	231	1
7	3	32	4	57	3	82	3	107	1	132	1	157	3	182	4	207	2	232	1
8	3	33	2	58	3	83	3	108	4	133	3	158	2	183	4	208	3	233	3
9	1	34	2	59	1	84	1	109	1	134	3	159	2	184	2	209	3	234	3
10	4	35	4	60	1	85	1	110	2	135	2	160	3	185	3	210	4	235	4
11	1	36	3	61	3	86	3	111	1	136	3	161	4	186	1	211	3	236	4
12	2	37	1	62	1	87	4	112	2	137	4	162	2	187	2	212	4	237	3
13	4	38	3	63	3	88	4	113	2	138	3	163	3	188	3	213	1	238	4
14	4	39	2	64	2	89	1	114	2	139	4	164	2	189	3	214	1	239	4
15	2	40	1	65	4	90	2	115	3	140	2	165	2	190	1	215	2	240	2
16	2	41	2	66	3	91	2	116	3	141	3	166	4	191	2	216	4	241	3
17	2	42	1	67	4	92	1	117	4	142	4	167	2	192	2	217	4	242	2
18	4	43	3	68	1	93	3	118	1	143	3	168	4	193	1	218	2	243	2
19	2	44	1	69	2	94	3	119	1	144	2	169	4	194	4	219	2	244	2
20	4	45	1	70	2	95	4	120	1	145	1	170	3	195	2	220	2	245	4
21	3	46	4	71	2	96	2	121	1	146	1	171	3	196	3	221	2	246	3
22	4	47	3	72	3	97	4	122	4	147	1	172	4	197	3	222	4	247	3
23	4	48	4	73	2	98	2	123	3	148	3	173	1	198	1	223	4	248	3
24	1	49	2	74	4	99	1	124	3	149	2	174	1	199	2	224	1	249	2
25	4	50	1	75	2	100	2	125	2	150	4	175	3	200	2	225	1	250	2

Ph: 948 99 00 886 E-mail: berkmansja@gmail.com

ST. ANNE'S ACADEMY

(MATHS & PHYSICS TUITION CENTRE)

I FLOOR, JAFRO DENTAL CLINIC, HOLY CROSS COLLEGE ROAD, PUNNAI NAGAR, NAGERCOIL – 629004

Qn No	Ans Code	Qn No	Ans Code	Qn No	Ans Code	Qn No	Ans Code	Qn No	Ans Code	Qn No	Ans Code	Qn No	Ans Code	Qn No	Ans Code	Qn No	Ans Code	Qn No	Ans Code
1		26		51		76		101		126		151		176		201		226	
2		27		52		77		102		127		152		177		202		227	
3		28		53		78		103		128		153		178		203		228	
4		29		54		79		104		129		154		179		204		229	
5		30		55		80		105		130		155		180		205		230	
6		31		56		81		106		131		156		181		206		231	
7		32		57		82		107		132		157		182		207		232	
8		33		58		83		108		133		158		183		208		233	
9		34		59		84		109		134		159		184		209		234	
10		35		60		85		110		135		160		185		210		235	
11		36		61		86		111		136		161		186		211		236	
12		37		62		87		112		137		162		187		212		237	
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16		41		66		91		116		141		166		191		216		241	
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18		43		68		93		118		143		168		193		218		243	
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21		46		71		96		121		146		171		196		221		246	
22		47		72		97		122		147		172		197		222		247	
23		48		73		98		123		148		173		198		223		248	
24		49		74		99		124		149		174		199		224		249	
25		50		75		100		125		150		175		200		225		250	

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