MATHS

BOOKS - TS EAMCET PREVIOUS YEAR PAPERS

TS EAMCET 2019 (3 MAY SHIFT 1)

Mathematics

1. Match the functions of List-I with their nature in List-II and choose the correct option

List I		List II	
(A)	$f: R \to R$ defined by $f(x) = \cos(112x - 37)$	(I)	Injection but not surjection
(B)	$f: A \to B$ defined by $f(x) = x\|x\|$ when $A = [-2, 2]$ and $B = [-4, 4]$	(II)	Surjection but not injection
(C)	$f: R \to R$ defined by $f(x) = (x-2)(x-3)(x-5)$	(III)	Bijection
(D)	$f: N \to N$ defined by $f(n) = n + 1$	(IV)	Neither Injection nor surjection
		(V)	Composite function

Then, the correct match is

A.
A B C D
I II III IV

B.
A B C D
IV I II III

C.
A B C D
IV III II V

D.
A B C D
IV III II I

Answer: D

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2. If [x] denotes the greatest integer function, then the domain of the function

$$f(x) = \sqrt{\frac{x - [x]}{\log(x^2 - x)}}$$ is

A. $(1, \infty)$

B. $(1, \infty) - Z$

C. $R - \left[\frac{1-\sqrt{5}}{2}, \frac{1+\sqrt{5}}{2}\right]$

D. $\left[\frac{1-\sqrt{5}}{2}, \frac{\sqrt{5}+1}{2}\right]$

Answer: C

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3. Assertion (A) If $|x| < 1$, then

$$\sum_{n=0}^{\infty} (-1)^n x^{n+1} = \frac{x}{x+1}$$

Reason (R) If $|x| < 1$, then $(1+x)^{-1}$

$= 1 - x + x^2 - x^3 + ...$

Which one of the following is true ?

A. (A) and (R) are true, (R) is a correct explsnstion of (A)

B. (A) and (R) are true but (R) is not a correct explanation of (A)

C. (A) is true, but (R) is talse

D. (A) is false, but (R) is true

Answer: A

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4. If $A = \begin{bmatrix} 1 & 2 & 3 \\ 1 & 3 & 5 \\ 2 & 1 & 6 \end{bmatrix}$, then $(A))^T =$

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5. If $\begin{vmatrix} x^2+3x & x+1 & x-3 \\ x-1 & 2-x & x+4 \\ x-3 & x-3 & 3x \end{vmatrix} = a_0 + a_1 x + a_2 x^2 + a_3 x^3 + a_4 x^4$, then

$(a_1 + a_3) + 2(a_0 + a_2 + a_4) =$

A. -1

B. 0

C. 1

D. -29

Answer: A

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6. Let $AX = D$ be a system of three linear non-homogeneous equations.

If $|A| = 0$ and rank $(A) =$ rank $([AD]) = \alpha$, then

A. $AX = D$ will have infinite number of solutions when $\alpha = 3$

B. $AX = D$ will have unique solution when $\alpha < 3$

C. $AX = D$ will have infinite number of solution when $\alpha < 3$

D. $AX = D$ will have no solution when $\alpha < 3$

Answer: C

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7. If $x + iy = (1 + i)^6 - (1 - i)^6$, then which one of the following is true ?

A. $x + y = 16$

B. $x + y = -16$

C. $x + y = -8$

D. $x + y = 8$

Answer: B

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8. $i^2 + i^3 + \ldots + i^{4000} =$

A. 1

B. 0

C. i

D. $-i$

Answer: D

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9. If 1, ω and ω^2 are the cube roots of unity, then $(a+b+c)\left(a+b\omega+c\omega^2\right)\left(a+b\omega^2+c\omega\right) =$

A. $a^3 + b^3 + c^3$

B. $a^3 + b^3 + c^3 - 3abc$

C. $(a+b+c)^3 - 3abc$

D. $a^3 + b^3 + c^3 + 3abc$

Answer: B

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10. The set of all values of 'a' for which the expression $\frac{ax^2+2x-3}{2x-3x^2+a}$ assumes all real values for real vales of x, is

A. [2, 3]

B. $R-(2,3)$

C. ϕ

D. $[1,5]$

Answer: C

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11. If both the roots of the equation $x^2-4ax+1-3a+4a^2=0$ exceed 1, then a lies in the interval

A. $\left(-\infty, \frac{7-\sqrt{17}}{8}\right)$

B. $\left(\frac{7+\sqrt{17}}{8}, \infty\right)$

C. $\left(\frac{7-\sqrt{17}}{8}, \frac{1}{2}\right)$

D. $\left(\frac{1}{2}, \frac{7+\sqrt{17}}{8}\right)$

Answer: B

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12. If the cubic equation $x^3 - ax^2 + ax - 1 = 0$ is identical with the cubic equation whose roots are the squares of the roots of the given cubic equation, then the non-zero real value of 'a' is

A. $\frac{1}{2}$

B. 2

C. 3

D. $\frac{7}{2}$

Answer: C

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13. If α, β, γ are roots of the equation $x^3 + px^2 + qx + r = 0$, then $(\alpha + \beta)(\beta + \gamma)(\gamma + \alpha)$ =

A. $p - qr$

B. $r - pq$

C. $q - rp$

D. $r + pq$

Answer: B

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14. Let x denote the number of ways of arranging m boys and m girls in a row so that no two boys sit together. If y and z give the number of ways of arranging m boys and m girls in a row and around a circular table respectively so that boys and girls sit alternately, then $x : y : z =$

A. $m + 1 : m : m - 1$

B. $3 : 2 : 1$

C. $m - 1 : m : 2$

D. $(m + 1)m : 2m : 1$

Answer: D

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15. The number of even numbers greater than 1000000 that can be formed using all the digit 1, 2, 0, 2, 4, 2 and 4 is

A. 120

B. 240

C. 310

D. 480

Answer: C

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16. The greatest integer less than or equal to $\left(\sqrt{3}+2\right)^{5}$ is

A. 721

B. 722

C. 723

D. 724

Answer: C

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17. The sixth term in the expansion of $\left(3-\sqrt{\frac{17}{4}+3\sqrt{2}}\right)^{10}$ is a

A. positive rational number

B. negative rational number

C. positive irrational number

D. negative irrational number

Answer: D

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18. Let

$$\frac{1}{\left(x^2-3\right)^2}=\frac{A_1}{x-\sqrt{3}}+\frac{A_2}{\left(x-\sqrt{3}\right)^2}+\frac{A_3}{x+\sqrt{3}}+\frac{A_4}{\left(x+\sqrt{3}\right)^2}$$. Then,

consider the following statements

(i) All the A_i's are not distinct

(ii) There exists a pair, A_p and A_q such that $A_p^2=A_q^2 (p \neq q)$

(iii) $\sum_{i=1}^{4} A_i=\frac{1}{6}$

(iv) $\sum_{i=1}^{4} A_i=1$

Which one of the following is true ?

A. Only statement (iii) is false

B. Both the statement (ii) and (iv) are false

C. Only statement (iv) is false

D. Both the statement (i) and (iii) are false

Answer: C

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19. The period of $\cos\left(x + 8x + 27x + \ldots + n^3 x\right)$ is

A. $\frac{2\pi}{n}$

B. $\frac{2\pi}{n^2(n+1)^2}$

C. $\frac{8\pi}{n^2(n+1)^2}$

D. $\frac{8\pi}{n^3(n+1)^2}$

Answer: C

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20.

$\sin^2(3^\circ) + \sin^2(6^\circ) + \sin^2(9^\circ) + \dots + \sin^2(84^\circ) + \sin^2(87^\circ) + \sin^2(90^\circ)$

A. $\frac{31}{2}$

B. $\frac{39}{2}$

C. $\frac{59}{2}$

D. 36

Answer: A

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21. $\cos\frac{\pi}{7} + \cos\frac{2\pi}{7} + \cos\frac{3\pi}{7} + \cos\frac{4\pi}{7} + \cos\frac{5\pi}{7} + \cos\frac{6\pi}{7} =$

A. 0

B. $\frac{3}{2}$

C. $\frac{3}{4}$

D. 1

Answer: D

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22. The number of integral values of k for which the equation $7\cos x + 5\sin x = 2k + 1$ has a solution, is

A. 4

B. 6

C. 8

D. 10

Answer: C

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23. $\sec\left(\tan^{-1}\frac{y}{2}\right) =$

A. $\sqrt{\frac{4+y^2}{2}}$

B. $\sqrt{\frac{4-y^2}{2}}$

C. $\frac{\sqrt{4+y^2}}{2}$

D. $\frac{\sqrt{4-y^2}}{2}$

Answer: C

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24. The number of roots of the equation $\sqrt{2}+e^{\cos h^{-1}x}-e^{\sin h^{-1}x}=0$ is

A. 0

B. 1

C. 2

D. 3

Answer: B

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25. A wire of length 44 cm is bent into an arc of a circle of radius 12 cm. The angle (in degrees) subtended by the arc at the centre of the circle is

A. $\left(\frac{11}{3}\right)^{\circ}$

B. $\left(\frac{660}{\pi}\right)^{\circ}$

C. 150°

D. $\left(\frac{5}{3}\right)^{\circ}$

Answer: B

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26. In any triangle ABC, if $a : b : c = 2 : 3 : 4$, then $R : r =$

A. $8:3$

B. $16:9$

C. $5:16$

D. $16:5$

Answer: D

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27. Corresponding to a triangle ABC, match the items given in List-I with the items given in List II.

	List I		List II
(A)	$rr_2 = r_1r_3$	(I)	$\angle A = 90^\circ$
(B)	$r_1 + r_2 = r_3 - r$	(II)	$b^2 = c^2 + a^2$
(C)	$r_1 = r + 2R$	(III)	$\angle C = 90^\circ$
		(IV)	$\angle B = 120^\circ$

The correct match is

A. $\begin{matrix} A & B & C \\ II & III & I \end{matrix}$

B. $\begin{matrix} A & B & C \\ II & I & III \end{matrix}$

C. $\begin{matrix} A & B & C \\ I & IV & II \end{matrix}$

D. $\begin{matrix} A & B & C \\ III & I & IV \end{matrix}$

Answer: A

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28. Let the position vectors of two points A and B be $a+b+c$ and $a-2b+3c$, respectively. If the points P and Q divide AB in the ratio 1 : 3 internally and externally respectively, then $3|AB| =$

A. $4|PQ|$

B. $3|PQ|$

C. $\frac{1}{2}|PQ|$

D. $2|PQ|$

Answer: A

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29. If a, b and c are three non-collinear points and $ka+2b+3c$ is a point in the plane of a, b, c then $k=$

A. 4

B. 5

C. -5

D. -4

Answer: C

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30. If the vector $a=3\hat{j}+4\hat{k}$ is the sum of two vectors a_1 and a_2, vector a_1 is parallel to $b=\hat{i}+\hat{j}$ and vector a_2 is perpendicular to b, then $a_1=$

A. $\frac{1}{2}\left(\hat{i}+\hat{j}\right)$

B. $\frac{1}{3}\left(\hat{i}+\hat{j}\right)$

C. $\frac{2}{3}\left(\hat{i}+\hat{j}\right)$

D. $\frac{3}{2}\left(\hat{i}+\hat{j}\right)$

Answer: D

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31. The angle between the line of intersection of the two planes $r.\left(2\hat{i}+2\hat{j}-3\hat{k}\right)=5, r.\left(3\hat{i}+3\hat{j}-5\hat{k}\right)=3$ and the line $r=3\hat{i}+2\hat{j}+\hat{k}+t\left(5\hat{i}+5\hat{j}-7\hat{k}\right)$ is

A. $\cos^{-1}\left(\frac{-1}{\sqrt{28}}\right)$

B. $\cos^{-1}\left(\frac{41}{\sqrt{17}\sqrt{99}}\right)$

C. $\frac{\pi}{2}$

D. $\frac{\pi}{3}$

Answer: C

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32. Let $x = \hat{i} + \hat{j}$ and $y = 3\hat{i} - 2\hat{k}$. Then, the vector r of magnitude $\sqrt{21}$ satisfying $r \times x = y \times x$ and $r \times y = x \times y$, is

A. $-\hat{i} + 4\hat{j} - 2\hat{k}$

B. $-\hat{i} - 4\hat{j} - 2\hat{k}$

C. $4\hat{i} + \hat{j} - 2\hat{k}$

D. $4\hat{i} - \hat{j} - 2\hat{k}$

Answer: C

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33. The acute angle between $r = \left(-\hat{i} + 3\hat{k}\right) + \lambda\left(2\hat{i} + 3\hat{j} + 6\hat{k}\right)$ and $r.\left(10\hat{i} + 2\hat{j} - 11\hat{k}\right) = 3$, is

A. $\sin^{-1}\left(\frac{8}{21}\right)$

B. $\cos^{-1}\left(\frac{8}{21}\right)$

C. $\sin^{-1}\left(\frac{5}{21}\right)$

D. $\cos^{-2}\left(\frac{5}{21}\right)$

Answer: A

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34. In a data with 15 number of observations $x_1, x_2, x_3, \ldots, x_{15}$, $\sum_{i=1}^{15} x_i^2 = 3600$ and $\sum_{i=1}^{15} x_i = 175$. If the value of one observation 20 was found wroung and was replaced by its correct value 40, them the correct variance of that data is

A. 151

B. 149

C. 145

D. 144

Answer: A

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35. If the coefficient of variation and variance of a frequency distribution are 7.2 and 3.24 respectively, then its mean is

A. 45

B. 25

C. 20

D. 16

Answer: B

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36. If five dice are thrown simultaneously, then the probability that alteast three of them show the same numbered face is

A. $\frac{16}{6^4}$

B. $\frac{452}{6^5}$

C. $\frac{276}{6^4}$

D. $\frac{123}{6^5}$

Answer:

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37. If two unbiased dice are rolled simultaneously unitl a sum of the number appered on these dice is either 7 or 11, then the probability that 7 comes before 11, is

A. $\frac{3}{8}$

B. $\frac{3}{4}$

C. $\frac{5}{6}$

D. $\frac{2}{9}$

Answer: B

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38. A box contains 10 mangoes out of which 4 are spoiled. 2 mangoes are taken together at random. If one of them is found to be good, then the probability that the other is also good, is

A. $\frac{1}{3}$

B. $\frac{2}{3}$

C. $\frac{8}{15}$

D. $\frac{5}{13}$

Answer: D

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39. Two dice are rolled. If a random variable X is defined as the absolute difference of the two numbers that appear on them, then the mean of X is

A. 0

B. $\frac{13}{18}$

C. $\frac{19}{9}$

D. $\frac{35}{18}$

Answer: D

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40. If getting a head on a coin when it is tossed is considered as success, then the probability of having more number of failures when ten fair coins are tossed simultaneously, is

A. $\frac{105}{2^8}$

B. $\frac{73}{2^7}$

C. $\frac{193}{2^9}$

D. $\frac{638}{2^{10}}$

Answer: C

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41. The set of all points that forms a triangle of area 15 sq units with the points (1, -2) and (-5, 3) lies on

A. $5x + 6y + 23 = 0$

B. $(5x + 6y - 23)(5x + 6y + 37) = 0$

C. $25x^2 + 36y^2 + 24x - 30y - 227 = 0$

D. $5x + 6y - 37 = 0$

Answer: B

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42. Suppose the new axes X, Y are generated by rotating the coordinate axes x, y about the origin through an angle of 30° in the anti-clockwise direction. Then the transformed equation of $x^2 + 2\sqrt{3}xy - y^2 = 2a^2$ with respect to new axes X, Y is

A. $X^2 - Y^2 = a^2$

B. $X^2 + y^2 = 2a^2$

C. $X^2 + 2\sqrt{3}XY - Y^2 = 2a^2$

D. $X^2 - Y^2 = 2a^2$

Answer: A

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43. A line L makes intercept a and b on the coordinate axes. The axes are rotated through an angle θ in the positive direction, keeping the origin fixed. If the line L makes intercept p and q on the new coordinate axes, then $\frac{1}{a^2} + \frac{1}{b^2} =$

A. $\frac{1}{p^2q^2}$

B. $\frac{1}{p^2} - \frac{1}{q^2}$

C. $\frac{1}{p^2} + \frac{1}{q^2}$

D. $\frac{pq}{p^2 + q^2}$

Answer: C

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44. If $m_1, m_2 (m_1 > m_2)$ are the slopes of the lines which make an angle of 30° with the line joining the points (1, 2) and (3, 4), then $\frac{m_1}{m_2} =$

A. $2 + \sqrt{3}$

B. $2 - \sqrt{3}$

C. $7 + 4\sqrt{3}$

D. $7 - 4\sqrt{3}$

Answer: C

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45. If $A(-2, 1), B(0, -2), C(1, 2)$ are the vertices of a triangle ABC, then the perpendicular distance from its circumcentre to the side BC is

A. A. $\frac{7\sqrt{13}}{22}$

B. B. $\frac{3\sqrt{17}}{22}$

C. C. $\frac{5\sqrt{10}}{11}$

D. D. $\frac{\sqrt{2026}}{22}$

Answer: B

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46. If one jine of the pair of lines $ax^2 + 2hxy + by^2 = 0$ bisects the angle between the coordinate axes, then prove that $(a+b)^2 = 4h^2$.

A. $a + b = 2h$

B. $a - b = 2|h|$

C. $(a+b)^2 = 4h^2$

D. $(a-b)^2 = 4h^2$

Answer: C

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47. The equation of the pair of perpendicular lines passing through origin and forming an isosceles triangle with the line $2x + 3y = 6$, is

A. $5x^2 - 24xy - 5y^2 = 0$

B. $4x^2 - 12xy - 4y^2 = 0$

C. $6x^2 - 5xy - 6y^2 = 0$

D. $9x^2 + 5xy - 9y^2 = 0$

Answer: A

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48. If one of the diameter of the circle $x^2 + y^2 - 2x - 6y + 6 = 0$ is a chord to the circle with centre (2, 1), then the radius of the bigger circle is

A. 6

B. 4

C. 2

D. 3

Answer: D

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49. The line $3x - y + k = 0$ touches the circle $x^2 + y^2 + 4x - 6y + 3 = 0$. If $k_1, k_2 (k_1 < k_2)$ are the two values of k, then the equation of the chord of contact of the point (k_1, k_2) with respect to the given circle is

A. $19x + y - 18 = 0$

B. $x + 19y - 3 = 0$

C. $x + 16y - 56 = 0$

D. $20x + 18y - 7 = 0$

Answer: C

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50. If the line $ax + by = 1$ is a tangent to the circle $S_r \equiv x^2 + y^2 - r^2 = 0$, then which one of the following is true ?

A. (a, b) lies on the circle $S_1 = 0$

B. (a, b) lies inside the circle $S_1 = 0$

C. (a, b) lies outside the circle $S_2 = 0$

D. (a, b) lies on the circle $S_3 = 0$

Answer: A

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51. Each of the two orthogonal circles C_1 and C_2 passes through both the points (2, 0) and (-2, 0). If $y = mx + c$ is a common tangent to these circles, then

A. $c^2 = 4(1 + 2m^2)$

B. $c^2 = 2(1 + 2m^2)$

C. $c^2 = 1 + m^2$

D. $c^2 m^2 = 4(1 + m^2)$

Answer: A

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52. Find the equation of the radical axis of the following circles. $x2 + y2 + 3x + 2y + 1 = 0 \& x2 + y2 + 3x + 4y + 2 = 0$ is

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53. Study the following statements.

I. The vertex of the parabola $x = ly^2 + my + n$ is $\left(n - \frac{m^2}{4l}, -\frac{m}{2l}\right)$

II. The focus of the parabola $y = lx^2 + mx + n$ is $\left(n + \frac{1 - m^2}{4l}, -\frac{m}{2l}\right)$

III. The pole of the line $lx + my + n = 0$ with respect to the parabola $x^2 = 4ay$ is $\left(-\frac{2al}{m}, \frac{n}{m}\right)$

Then the correct option among the following is

A. A. All the three statement are true

B. B. Statement I & II are true but III is false

C. C. Statement I & III are true but II is false

D. D. Statement II & III are true but I is false

Answer: C

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54. Let P represent the point (3, 6) on the parabola $y^2 = 12x$. For the parabola $y^2 = 12x$, if l_1 is the length of the normal chord drawn at P and l_2 is the length of the focal chord drawn through P, then $\frac{l_1}{l_2} =$

A. $2\sqrt{2}$

B. 3

C. $4\sqrt{2}$

D. 5

Answer: A

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55. A tangent is drawn at $(3\sqrt{3}\cos\theta, \sin\theta)\left(0 < \theta < \frac{\pi}{2}\right)$ to the ellipse $\frac{x^2}{27} + \frac{y^2}{1} = 1$. The value of θ for which the sum of the intercepts on the coordinate axes made by this tangent attains the minimum, is

A. $\frac{\pi}{6}$

B. $\frac{\pi}{3}$

C. $\frac{2\pi}{3}$

D. $\frac{2\pi}{4}$

Answer: A

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56. A line perpendicular to the X-axis cuts the circle $x^2 + y^2 = 9$ at A and the ellipse $4x^2 + 9y^2 = 36$ at B such that A and B lie in the same quadrant. If θ is the greatest acute angle between the tangents drawn to the curves at A and B, then $\tan\theta =$

A. $\frac{1}{12}$

B. $\frac{1}{2\sqrt{6}}$

C. $\frac{5}{24}$

D. $\frac{5}{4\sqrt{6}}$

Answer: B

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57. If e_1 is the eccentricity of the ellipse $\frac{x^2}{16}+\frac{y^2}{25}=1$ and e_2 is the eccentricity of a hyperbola passing through the foci of the given ellipse and $e_1e_2=1$, then the equation of such a hyperbola among the following is

A. $\frac{x^2}{9}-\frac{y^2}{16}=1$

B. $\frac{y^2}{9}-\frac{x^2}{16}=1$

C. $\frac{x^2}{9}-\frac{y^2}{25}=1$

D. $\frac{x^2}{25}-\frac{y^2}{9}=1$

Answer: B

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58. If $(1, 0, 3), (2, 1, 5), (-2, 3, 6)$ are the mid-points of the sides of a tringle, then the centroid of the triangle is

A. $\left(\frac{1}{3}, \frac{4}{3}, -\frac{14}{3}\right)$

B. $\left(\frac{1}{3}, \frac{4}{3}, \frac{14}{3}\right)$

C. $\left(\frac{1}{3}, -\frac{4}{3}, \frac{14}{3}\right)$

D. $\left(-\frac{1}{3}, \frac{4}{3}, \frac{14}{3}\right)$

Answer: B

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59. If a plane P passes through the points (1, 0, 0), (0, 1, 0) and makes an angle $\frac{\pi}{4}$ with the plane $x + y = 3$, then the direction ratios of a normal to that plane P is

A. $1, \sqrt{2}, 1$

B. $1, 1, \sqrt{2}$

C. $1, 1, 2$

D. $\sqrt{2}, 1, 1$

Answer: B

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60. A variable plane is at a distance of 6 units from the origin. If it meets the coordinate axes in A, B and C, then the equation of the locus of the centroid of the ΔABC is

A. $\frac{1}{x^2} + \frac{1}{y^2} + \frac{1}{z^2} = \frac{1}{4}$

B. $x^2 + y^2 + z^2 = 4$

C. $\frac{1}{x^2} + \frac{1}{y^2} + \frac{1}{z^2} = 1$

D. $\frac{1}{x^2} + \frac{1}{y^2} - \frac{1}{z^2} = \frac{1}{4}$

Answer: A

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61. $\lim_{x \to \infty} \left(\frac{2x^2 + 3x + 4}{x^2 - 3x + 5} \right)^{\frac{3|x|+1}{2|x|-1}} =$

A. $\frac{3}{2}$

B. $2\sqrt{2}$

C. 3

D. $\sqrt{3}$

Answer: B

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62. If 'a' is the point of discontinuity of the function

$$f(x) = \begin{cases} \cos 2x, & \text{for } -\infty < x < 0 \\ e^{3x}, & \text{for } 0 \leq x < 3 \\ x^2 - 4x + 3, & \text{for } 3 \leq x \leq 6 \\ \frac{\log(15x - 89)}{x - 6}, & \text{for } x > 6 \end{cases}$$

Then, $\lim_{x \to a} \frac{x^2 - 9}{x^3 - 5x^2 + 9x - 9} =$

A. 1

B. 0

C. 6

D. 3

Answer: A

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63. If $y=(x+1)\left(x^2+1\right)\left(x^4+1\right)\left(x^8+1\right)$, then $\lim_{x\to -1}\frac{dy}{dx}=$

A. 0

B. 2

C. -4

D. 8

Answer: D

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64. f(x) is a twice differentiable function such that $f''(x) = -f(x)$ and $f'(x) = g(x)$. If $h(x) = (f(x))^2 + (g(x))^2$ and $h(1) = 2$, then $h(2) =$

A. A. 0

B. B. 1

C. C. 2

D. D. 4

Answer: C

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65. If $y = \sqrt{x + \sqrt{y + \sqrt{x + \sqrt{y + \ldots \infty}}}}$, then $\frac{dy}{dx} =$

A. $\frac{y^3 - x}{2y^2 - 2xy + 1}$

B. $\frac{x + y^3}{2y^2 - x}$

C. $\frac{y + x}{y^2 - 2x}$

D. $\dfrac{y^2 - x}{2y^3 - 2xy - 1}$

Answer: D

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66. The tangent of the angle between the curves $xy = 1$ and $x^2 + 8y = 0$ is

A. $\dfrac{1}{7}$

B. $\dfrac{2}{7}$

C. $\dfrac{6}{7}$

D. $\dfrac{3}{7}$

Answer: C

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67. The slope of the tangent at (1, 2) to the curve $x = t^2 - 7t + 7$ and $y = t^2 - 4t - 10$, is

A. $\frac{8}{5}$

B. $\frac{5}{8}$

C. $-\frac{8}{5}$

D. $-\frac{5}{8}$

Answer: A

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68. If $f(x) = 2x^3 - 3x^2 - x + 1$ Then f(x-1)

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69. If $f(x)=\int_{x}^{x+1} e^{-t^2}dt$, then the interval in which $f(x)$ is decreasing is

A. $\left(-\frac{1}{2}, \infty\right)$

B. $(-\infty, 2)$

C. $(-\infty, 0)$

D. $(-2, 2)$

Answer: A

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70. If $\int \frac{\cos x+x}{1+\sin x}dx=f(x)+\int \frac{3\cos\frac{x}{2}-\sin\frac{x}{2}}{\cos\frac{x}{2}+\sin\frac{x}{2}}dx+c$, then $f(x)=$

A. $\dfrac{-2x}{1+\tan\frac{x}{2}}$

B. $\dfrac{-x\cos\frac{x}{2}}{\cos\frac{x}{2}+\sin\frac{x}{2}}$

C. $\dfrac{2x}{1+\tan\frac{x}{2}}$

D. $\dfrac{x\cos\frac{x}{2}}{\cos\frac{x}{2}+\sin\frac{x}{2}}$

Answer: A

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71. $\int \dfrac{\sqrt{\cos 2x}}{\sin x}dx =$

A. $\dfrac{1}{2\sqrt{2}}\log\left|\dfrac{\sqrt{2}+\sqrt{1-\tan^2 x}}{\sqrt{2}-\sqrt{1-\tan^2 x}}\right| - \dfrac{1}{2}\log\left|\dfrac{1-\sqrt{1-\tan^2 x}}{1+\sqrt{1-\tan^2 x}}\right| + c$

B. $\dfrac{1}{\sqrt{2}}\log\left|\dfrac{\sqrt{2}+\sqrt{1-\tan^2 x}}{\sqrt{2}-\sqrt{1-\tan^2 x}}\right| - \dfrac{1}{2}\log\left|\dfrac{1+\sqrt{1-\tan^2 x}}{1-\sqrt{1-\tan^2 x}}\right| + c$

C. $\dfrac{1}{4\sqrt{2}}\log\left|\dfrac{\sqrt{2}-\sqrt{1-\tan^2 x}}{\sqrt{2}+\sqrt{1-\tan^2 x}}\right| + \dfrac{1}{2}\log\left|\dfrac{1-\sqrt{1-\tan^2 x}}{1+\sqrt{1-\tan^2 x}}\right. + c$

D. $\dfrac{1}{4\sqrt{2}}\log\left|\dfrac{2-\sqrt{1-\tan^2 x}}{2+\sqrt{1-\tan^2 x}}\right| + \dfrac{1}{2\sqrt{2}}\log\left|\dfrac{1-\sqrt{1-\tan^2 x}}{1+\sqrt{1-\tan^2 x}}\right| + c$

Answer: B

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72. If $\int \frac{(2x+3)}{x(x+1)(x+2)(x+3)+1}dx = -\frac{1}{px^2+qx+r}+c$ then $\frac{3p-q}{r}=$

A. 0

B. 1

C. 2

D. -1

Answer: A

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73. Evaluate the integerals.

$\int (\log x)^2 dx (0, \infty).$

A. $x \log x - 2x \log x + c$

B. $x \log x + 2x \log x + c$

C. $x(\log x)^2 - 2x(\log x - 1) + c$

D. $x(\log x)^2 + 2x(\log x - 1) + c$

Answer: C

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74. $\lim_{n \to \infty} \sum_{k=1}^{n} \frac{k}{n^2 + k^2} =$

A. $\frac{1}{2}\log 2$

B. $2\log 2$

C. $\frac{1}{3}\log 2$

D. $3\log 2$

Answer: A

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75. $\int_0^{10} \left(5 - \sqrt{10x - x^2}\right) dx =$

A. $50 - 25\pi$

B. $(100 - 25\pi)$

C. $\frac{1}{2}(100 - 25\pi)$

D. $\frac{1}{4}(100 - 25\pi)$

Answer: C

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76. Area of the region (in sq units) bounded by the curves $y = \sqrt{x}, x = \sqrt{y}$ and the lines $x = 1, x = 4$ is

A. $\frac{8}{3}$

B. $\frac{49}{3}$

C. $\frac{16}{3}$

D. $\frac{14}{3}$

Answer: B

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77. The differential equation representing the family of circles of constant radius r is

A. $r^2 y = \left[1 + (y')^2\right]^2$

B. $r^2 (y)^2 = \left[1 + (y')^2\right]^2$

C. $r^2 (y'')^2 = \left[1 + (y')^2\right]^3$

D. $(y)\hat{}(2) = \mathrm{r}\hat{}(2)\ [1 + (\mathrm{y})^2]^2$

Answer: C

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78. The solution of the differential equation $(2x - 3y + 5)dx + (9y - 6x - 7)dy = 0$, is

A. $3x - 3y + 8\log|6x - 9y - 1| = c$

B. $3x - 9y + 8\log|6x - 9y - 1| = c$

C. $3x - 9y + 8\log|2x - 3y - 1| = c$

D. $3x - 9y + 4\log|2x - 3y - 1| = c$

Answer: B

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79. The solution of the differential equation $\sqrt{1-y^2}dx + xdy - \sin^{-1}ydy = 0$, is

A. $x = \sin^{-1}y - 1 + ce^{-\sin^{-1}y}$

B. $y = x\sqrt{1-y^2} + \sin^{-1}y + c$

C. $x = 1 + \sin^{-1}y + ce^{\sin^{-1}y}$

D. $y = \sin^{-1}y - 1 + x\sqrt{1-y^2} + c$

Answer: A

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