MATHS

BOOKS - TS EAMCET PREVIOUS YEAR PAPERS

AP EAMCET SOLVED PAPER 2019 (22-04-2019, SHIFT-2)

Mathematics

1. Let f be a function such that $f(xy) = \frac{f(x)}{y}$ for all positive real numbers x, y. If f(20) = 15, then f(50) =

A. $\frac{75}{2}$

B. 12

C. 6

D. 75

Answer: C

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2. If $f: A \rightarrow B$ is a function defined by $f(x) = \frac{x^2 - x}{x^2 + 2x}$, then which one of the following is true?

A. A = R - {0, -2}, B = R and f(x) is decreasing function

B. A = R - {-2}, B = R - {1} and $f^{-1}(x)$ is decreasing function

C. A = R - {0, -2}, B = R - {1} and $f^{-1}(x)$ is increasing function

D. Both f(x) and $f^{-1}(x)$ are increasing functions

Answer: C

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3. The statement "$n^5 - 5n^3 + 4n$ is divisible by 120" is true for

A. n = 1 only

B. n = 10 only

C. n = 100 only

D. All positive integer values of n

Answer: D

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4. Let $A=\begin{bmatrix}7 & 5\\ 4 & 8\end{bmatrix}, B=\begin{bmatrix}4 & 3\\ 7 & 5\end{bmatrix}$ and $C=\begin{bmatrix}-5 & 3\\ 7 & -4\end{bmatrix}$

IF Tr(S) denotes the trace of a square matrix S then

$\sum_{k=0}^{\infty}\frac{1}{3^k}Tr\left\{A(BC)^k\right\}=$

A. $\frac{45}{2}$

B. 36

C. $\frac{81}{2}$

D. 9

Answer: A

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5. If the inverse of the matrix $A = \begin{bmatrix} 3 & 4 & 5 \\ 2 & -1 & 8 \\ 5 & -2 & 7 \end{bmatrix}$ is B, then $B^T =$

A. $\frac{1}{136}\begin{bmatrix} 9 & 26 & 1 \\ -38 & -4 & 26 \\ 37 & -14 & -11 \end{bmatrix}$

B. $\frac{1}{136}\begin{bmatrix} 9 & -38 & 37 \\ 26 & -4 & -14 \\ 1 & 26 & -11 \end{bmatrix}$

C. $\frac{1}{136}\begin{bmatrix} 9 & 26 & 1 \\ 37 & -14 & -11 \\ -38 & -4 & 26 \end{bmatrix}$

D. $\frac{1}{136}\begin{bmatrix} 9 & 1 & 26 \\ -38 & 26 & -4 \\ 37 & -11 & -14 \end{bmatrix}$

Answer: A

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6. If $x=\alpha, y=\beta, z=\gamma$ is the solution of the system of equations $x+y+z=4, 2x-y+3z=9, 3x+y+2z=8,\quad \text{then}\ \ 4\alpha+2\beta+3\gamma =$

A. 0

B. 1

C. 12

D. 19

Answer: C

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7. $\left(\dfrac{2}{i+\sqrt{3}}\right)^{100}+\left(\dfrac{2}{i-\sqrt{3}}\right)^{100}=$

A. 2

B. 1

C. -1

D. -2

Answer: C

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8. If $a = 3 + 4i$, z_1 and z_2 are two complex numbers such that $|z_1| = 3$ and $|z_2 - a| = 2$, then the maximum value of $|z_1 - z_2|$ is

A. 5

B. 10

C. 15

D. 20

Answer: B

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9. If α is the real root and β, γ are the complex roots of the equation $x^3 + 3x^2 + 3x + 28 = 0$, then $2\alpha + 3\beta + 3\gamma =$

A. -5

B. 0

C. 5

D. -23

Answer: A

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10. Given that $\alpha, \beta, \gamma, \delta$ are in a geometric progression. If α, β are the roots of $x^2 - x + p = 0$ and γ, δ are the roots of $x^2 - 4x + q = 0$, where p and q are integers, then the ordered pair (p, q) =

A. (2, 32)

B. (2, -32)

C. (-2, 32)

D. (-2, -32)

Answer: D

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11. If A, B, C are the sets of all values of x, for which $x^2 - 5x - 14$ is positive, $-6x^2 + 2x - 3$ is negative and $4x - 5x^2 + 2$ is negative respectively, then $A \cap B \cap C =$

A. (-2, 7)

B. ϕ

C. $\left(\frac{2-\sqrt{14}}{5}, \frac{2+\sqrt{14}}{5}\right)$

D. R

Answer: C

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12. The complex solution set of the inequation $\sqrt{x^2 - 3x + 2} > (3 - x)$ is

A. $\left(\frac{7}{3}, 3\right]$

B. $(3, \infty)$

C. $(-\infty, 1] \cup [2, \infty)$

D. $\left(\frac{7}{3}, \infty\right)$

Answer: D

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13. Solve the equation $6x^4 - 35x^3 + 62x^2 - 35x + 6 = 0$.

A. 2

B. $\frac{5}{2}$

C. 3

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

Answer: C

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14. I. The number of all ten digited numbers that can be formed with all the distinct digits and which ar divisble by 4 is 15×81.

II. The number of positive integers that can be formed by using the digits 0, 1, 2, 3, 4, 5 without any repetition is 630.

A. Only I is true

B. Only II is true

C. Both I and II are true

D. Both I and II are false

Answer: B

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15. A man has 5 male and 4 female relatives. His wife has 4 male and 5 female relatives. The number of ways in which they can invite 5 male and 5 female relatives so that 5 of them are man's relatives and remaining 5 are his wife's relatives

A. A 5426

B. B 5226

C. C 5526

D. D 5626

Answer: D

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16. If the coefficients of $r^{th}, (r+1)^{th}$ and $(r+2)^{th}$ terms in the expansion of $(1+x)^{14}$ are in an arithmetic progression, then r =

A. 4 or 10

B. 5 or 9

C. 8 or 6

D. 7

Answer: B

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17. If $x = \frac{5}{(2!).3} + \frac{5.7}{(3!).3^2} + \frac{5.7.9}{(4!).3^3} + \ldots.$

then find the value of $x^2 + 4x$.

A. 17

B. 23

C. 27

D. 39

Answer: B

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18. If the periods of the functions sin(ax+b) and tan(cx+d) are respectively $\frac{4}{7}$ and $\frac{2}{5}$, then $\sin(|a|+|c|)+\cos(|a|-|c|)=$

A. -1

B. 0

C. 1

D. 2

Answer: A

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19. The smallest positive value of x (in degress) for whiich $\tan(x+100^\circ)=\tan(x+50^\circ).\tan x\tan(x-50^\circ)$ is

A. 25°

B. $82\frac{1}{2^\circ}$

C. 55°

D. 30°

Answer: D

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20. For $\alpha \neq 0$, if $\cos(\theta+\alpha), \cos\theta$ and $\cos(\theta-\alpha)$ are in harmonic progression, then $\sec^2\theta \cdot \cos^2\frac{\alpha}{2} =$

A. 2

B. 1

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

D. $\frac{1}{4}$

Answer: C

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21. If $\cos 2\theta + \alpha \sin \theta = 2\alpha - 7$ has a solution, then

A. $\alpha \in [-2, 4]$

B. $\alpha \in [-6, -2]$

C. $\alpha \in [6, 8]$

D. $\alpha \in [2, 6]$

Answer: D

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22. If x = a is a solution of the equation $\sin^{-1}\frac{x}{3} + \sin^{-1}\frac{2x}{3} = \sin^{-1}x$, then the roots of the equation $x^2 - ax - 1 = 0$ are

A. ± 1

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

C. $\pm\frac{1}{2}$

D. $-\frac{1}{2}, 1$

Answer: A

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23. The set of all real values of x for which

$$f(x) = \log_e \sqrt{\frac{1+x}{1-x}} + \log_e\left(\frac{1+\sqrt{1-x^2}}{x}\right) + \coth^{-1} x + \log_e\left(\frac{1+\sqrt{1}}{x}\right.$$

is defined is

A. ϕ

B. (0, 1)

C. (-1, 1)

D. (0, 1]

Answer: B

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24. If $A = 60^\circ \text{ then } \frac{1}{a+b} + \frac{1}{a+c} =$

A. $\frac{3(1+b-c)}{a+b+c}$

B. $\frac{2}{a+b+c}$

C. $\frac{3}{a+b+c}$

D. $\frac{a+b+c}{3a^2}$

Answer: C

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25. In a $\Delta ABC, 8R^3 \sum \sin^3 A \cos(B-C) =$

A. abc

B. 4abc

C. $3R\Delta$

D. $12R\Delta$

Answer: D

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26. In a ΔABC, if $a:b:c=4:5:6$, then the ratio of the radius of the circumcircle to the radius of the incircle is

A. $13:7$

B. $15:7$

C. $16:7$

D. $17:9$

Answer: C

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27. a, b, c are three mutually perpendicular unit vectors in the right handed system. If the points P, Q, R with position vectors $2a+5b-4c, a+4b-3c$ and $ka+7b-6c$ respectively lie on a line, then the ratio in which the point P divides QR is

A. $1:2$

B. $-1:3$

C. $3:1$

D. $-1:2$

Answer: A

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28. Let π be the plane passing through the points $\hat{i}, \hat{j}, \hat{i}+\hat{j}+\hat{k}$ and L be the line passing through the point $\hat{i}+2\hat{j}+3\hat{k}$ and parallel to the vector $\hat{i}-\hat{j}+\hat{k}$. If $P(\alpha, \beta, \gamma)$ is the point of intersection of the plane π and line L, then $\sqrt{(\alpha^2+\beta^2)\gamma^2} =$

A. 0

B. 1

C. 6

D. $\sqrt{14}$

Answer: C

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29. If $a = \hat{i} - \hat{j} - \hat{k}, b = 2\hat{i} - 3\hat{j} + \hat{k}$ and p_1, p_2 are the orthogonal projection vectors of a on b and b on a respectively, then $(p_1 + p_2) \cdot (p_1 - p_2) =$

A. $-\frac{46}{21}$

B. $\frac{25}{7}$

C. $\frac{44}{7}$

D. $-\frac{88}{21}$

Answer: D

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30. Let a, b, c be three non-coplanar vectors and $a' = \frac{b \times c}{[abc]}, b' = \frac{c \times a}{[abc]}, c' = \frac{a \times b}{[abc]}$. The length of the altitude of the parallelopiped formed by a a', b', c' as coterminous edges, with respect to the base having a' and c' as its adjacent sides is

A. $|a|$

B. $\frac{1}{|b|}$

C. $|c|$

D. $\frac{1}{|a \times c|}$

Answer: B

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31. Let a, b, c be three non-coplanar vectors. Let $S_i (i = 1, 2, 3, 4, 5, 6)$ denonte the six scalar triple products formed by all possible permutations of a, b, c. If i, j, k, l are randomly chosen distinct numbers from 1 to 6 and if $x = \frac{S_i}{S_j} + \frac{S_k}{S_l}, y = \frac{S_i}{S_j} - \frac{S_k}{S_l}$, then $x^2 + y^2 =$

A. 1

B. 4

C. 8

D. 2

Answer: B

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32. If

$a = \hat{i} - 2\hat{j} + \hat{k}, b = \hat{i} + 3\hat{j} - 2\hat{k}, c = 2\hat{i} + \hat{j} - \hat{k}$ and $d = \hat{i} + \hat{j} + \hat{k}$,

then the volume (in cubic units) of the tetrahedron having $(a \times b) \times c, b, d$ as its coterminuous edges is

A. $\frac{15}{2}$

B. 90

C. $\frac{21}{2}$

D. $\frac{66}{5}$

Answer: C

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33. The mean deviation of the data 3, 5, 11, 13, 17, 19, 23, 29 about its arithmetic mean is

A. A. 8.5

B. B. 8

C. C. 7.2

D. D. 7

Answer: D

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34. If the weights of 10 persons (in kgs) are observed as : 45, 49, 55, 50, 41,44 , 60, 58, 53, 55, then the variance of their weights is

A. A 51

B. B 42.8

C. C 39.4

D. D 35.6

Answer: D

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35. If two dice are rolled at a time, then the probability of getting an odd number on the first die or a total of 7 on both dice is

A. $\frac{5}{9}$

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

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

D. $\frac{7}{12}$

Answer: D

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36. If A and B are two events of a random experiment such that $P(\overline{A}) = 0.3, P(B) = 0.4$ and $P(A \cap \overline{B}) = 0.5,$ then $P(A \cup B) + P($

A. 0.95

B. 1.15

C. 1.25

D. 0.25

Answer: B

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37. A speaks truth in 4 out of 5 times. A die is tossed. If A reports that there is 4 on the die, then the probability that there was 4 on the die, is

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

B. $\frac{4}{9}$

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

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

Answer: B

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38. Let S = {1, 2, 3,...., 50} and A_k be the set of multiples of k in S for $k \in N$. IF x_k is a number chosen from A_k, then match the items of List-I with the items of List-II.

List I		List II	
A.	$P(x_3 < 30)$	I.	$\frac{1}{2}$
B.	$P(15 < x_4 \leq 36)$	II.	$\frac{2}{3}$
C.	$P(x_7 > 35)$	III.	$\frac{2}{7}$
D.	$P(x_{11} > 11)$	IV.	$\frac{1}{4}$
		V.	$\frac{3}{4}$
		VI.	$\frac{9}{16}$

The correct match is

A. A B C D

VI I IV V

B. A B C D

III I VI V

C. A B C D

II V I IV

D. A B C D

VI I III V

Answer: D

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39. If X is a Poisson variate such that $P(X=2)=9P(X=4)$, then the mean and variance of X are

A. (1, 2)

B. (1, 1)

C. (2, 1)

D. (2, 2)

Answer: B

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40. Let P be the point (4, 1) and Q be its image in the line y = x. If Q is translated through a distance 2 units along the negative Y-axis to reach the point R, then the co-ordinates of R are

A. (-1, 2)

B. (1, -2)

C. (-1, -2)

D. (1, 2)

Answer: D

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41. The normal form of the line x+y+1=0 is

A. $x\cos(45^\circ) + y\sin(135^\circ) = \frac{1}{\sqrt{2}}$

B. $x\cos(45^\circ) + y\sin(45^\circ) = \frac{1}{\sqrt{2}}$

C. $x\cos(225^\circ) + y\sin(225^\circ) = \frac{1}{\sqrt{2}}$

D. $x\cos(45^\circ) + y\sin(45^\circ) = -\frac{1}{\sqrt{2}}$

Answer: C

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42. The vetices of a triangle are O(0, 0), B(-3, -1), C(-1, -3). The equation of the line parallel to BC and intersecting the sides OB and OC whose perpendicular distance from O is $1/2$ is

A. $x + y + \sqrt{2} = 0$

B. $2x + 2y - \sqrt{2} = 0$

C. $2x + 2y + \sqrt{2} = 0$

D. $2x - 2y + \sqrt{2} = 0$

Answer: B

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43. A variable line passing through a fixed point (α, β) intersects the coordinate axes at A and B. If O is the origin, then the locus of the centroid of the ΔOAB is

A. $\beta x + \alpha y = 3xy$

B. $\alpha x + \beta y = 3xy$

C. $\alpha x - \beta y = 3xy$

D. $\beta x - \alpha y = 3xy$

Answer: A

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44. If A is the orthocentre of the triangle formed by $2x^2 - y^2 = 0, x + y - 1 = 0$ and B is the centroid of the triangle formed by $2x^2 - 5xy + 2y^2 = 0, 7x - 2y - 12 = 0$, then the distance between A and B is

A. $\sqrt{5}$

B. 1

C. 5

D. $\sqrt{2}$

Answer: A

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45. The distance between the pair of lines represented by

$x^2 + 2\sqrt{2}xy + 2y^2 + 4x + 4\sqrt{2}y + 1 = 0$, is

A. 1

B. 2

C. $\sqrt{2}$

D. 4

Answer: B

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46. The number of integers α, for which a chord of the circle $x^2 + y^2 = 75$ is bisected at $(8, \alpha)$ and that the slope of the chord is an integer, is

A. 10

B. 8

C. 4

D. 3

Answer: B

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47. If the line $x - 6y - 12 = 0$ meets the circle $S \equiv x^2 + y^2 - 4x + 8y + 6 = 0$ at A and B, then the point of intersection of the tangents at A and B to S = 0 is

A. (1, 2)

B. (2, 1)

C. (-1, 2)

D. (2, -1)

Answer: A

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48. A circle of radius 5 units passes through A(-5, 0) and B(5, 0). If $P(5\cos\alpha, 5(\sin\alpha), Q(5\cos\beta, 5\sin\beta)$ are two points on this circle such that $\alpha - \beta = \frac{\pi}{2}$, then the locus of the point of intersection of the line AP and BQ is

A. $x^2 + y^2 - 10x - 25 = 0$

B. $x^2 + y^2 + 10x - 25 = 0$

C. $x^2 + y^2 + 10y - 25 = 0$

D. $x^2 + y^2 - 10y - 25 = 0$

Answer: D

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49. The condition that the circles which passes through the points $(0, a), (0, -a)$ and touch the line $y = mx + c$ will cut orthogonally is

A. $a^2 + m^2$

B. $a^2(1 + m)^2$

C. $a^2(1 + m^2)$

D. $a^2(1 + 2m^2)$

Answer: B

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50. For the system of circles given by $(x^2 + y^2 + 2gx) + \lambda(x^2 + y^2 + 2fy + l) = 0$, where $g \neq 0, f \neq 0$ and is a parameter, if the line joining the points circles of the system subtends a right angle at the origin, then $\frac{k}{f^2 =}$

A. -1

B. 1

C. 2

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

Answer: C

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51. For the parabola $y^2 + 2x + 2y - 3 = 0$, match the items in List-I with those from List-II.

List I		List II
A. Vertex	I.	$2x - 5 = 0$
B. Focus	II.	$\left(\frac{3}{2}, -1\right)$
C. Equation of the Directrix	III.	$x - 2 = 0$
D. Equation of the Axis	IV.	$y + 1 = 0$
	V.	$(2, -1)$
	VI.	$\left(2, \frac{3}{2}\right)$

The correct match is

A. A B C D

V VI I III

B. A B C D

V II I IV

C. A B C D

VI V IV I

D. A B C D

II VI III IV

Answer: B

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52. The area (in sq units) of the triangle formed by the normal to the parabola $y^2 = 16x$ whose slope is $\frac{1}{2}$ with the co-ordinates axes is

A. $\frac{9}{4}$

B. $\frac{27}{4}$

C. $\frac{54}{4}$

D. $\frac{81}{4}$

Answer: D

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53. If the major axis of an ellipse lies on the Y-axis, its minor axis lies on the X-axis and the length of its latusrectum is equal to $\frac{2}{3}$ of its minor axis, then the eccentricity of that ellipse is

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

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

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

D. $\frac{\sqrt{5}}{3}$

Answer: D

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54. If $y = x + c$ is a normal to the ellipse $\frac{x^2}{25} + \frac{y^2}{9} = 1, \quad \text{then} \quad c^2 =$

A. A $\frac{128}{17}$

B. B $\frac{17}{128}$

C. C 34

D. D 225

Answer: A

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55. The area (in sq units) of the quadrilateral formed by the four common tangents drawn to the two hyperbolas $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ and $\frac{y^2}{a^2} - \frac{x^2}{b^2} = 1 (a > b)$ is

A. $a^2 - b^2$

B. $2(a^2 - b^2)$

C. $\frac{a^2 - b^2}{\sqrt{2}}$

D. $\frac{a^2 - b^2}{2}$

Answer: B

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56. The direction cosines of the line which is perpendicular to the lines with direction cosines proportional to (1, -2, -2) and (0, 2, 1) are

A. A $\frac{2}{3}, \frac{-1}{3}, \frac{-2}{3}$

B. B $\frac{2}{3}, \frac{-1}{3}, \frac{-2}{3}$

C. C $\frac{2}{3}, \frac{-1}{3}, \frac{2}{3}$

D. D $\frac{2}{3}, \frac{2}{3}, \frac{-1}{3}$

Answer: C

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57. The number of lines passing through (0, 0, 0) and making an angle of 45° with each of the three co-ordinate axes is

A. 0

B. 2

C. 4

D. 8

Answer: B

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58. The equation of the plane which passes through the point (2, 5, -8) and perpendicular to each of the planes 2x-3y+4z+1=0 and 4x+y-2z+6=0 is

A. x+10y+7z+4=0

B. x+2y+2z+4=0

C. 3x+2y+2z=0

D. x+10y+7z-4=0

Answer: A

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59. $\lim_{x \to \frac{\pi}{6}} \frac{\sin\left(x - \frac{\pi}{6}\right)}{\frac{\sqrt{3}}{2} - \cos x} =$

A. 0

B. 1

C. 2

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

Answer: C

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60. The integer 'n' is for which $Lt_{x \to 0} \frac{(\cos x - 1)(\cos x - e^x)}{x^n}$ is a finite non zero numberis

A. 4

B. 3

C. 2

D. 1

Answer: B

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61. If $f(x) = \int_{-1}^{x} |t| dt, x \geq 1$, then

A. f is continuous at x=0 but f' is not continuous

B. both f and f' are continuous for all $x > -1$

C. f is continuous for $x > -1$ but f' is not continuous

D. f and f' are differentiable at x=0

Answer: A

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62. If $x = \sinh^{-1}\left[\log\left(1 + \sqrt{y}\right)\right], \quad \text{then} \quad \frac{dy}{dx} =$

A. $2\left(y + \sqrt{y}\right)\sinh x$

B. $2\left(y + \sqrt{y}\right)\sqrt{1 - \left(\log\left(1 + \sqrt{y}\right)\right)^2}$

C. $2\left(y + \sqrt{y}\right)(\cosh x$

D. $2\left(y+\sqrt{y}\right)\log\left(1+\sqrt{y}\right)$

Answer: C

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63. If $f(x)=\frac{(7x+1)\sin x}{e^x\log x}$ and $f'(x)=f(x)g(x)$, then $g'(x)=$

A. $\frac{1}{x^2\log x}+\frac{1}{(x\log x)^2}-\cos ec^2x-\frac{49}{(7x+1)^2}$

B. $\frac{1}{x^2\log x}+\frac{1}{\log x}-\cos ec^2x-\frac{49}{(7x+1)^2}$

C. $\frac{1}{(x\log x)^2}+\frac{1}{\log x}-\cos ec^2x-\frac{49}{(7x+1)^2}$

D. $\frac{1}{x^{\square}}\left(x^2\log x\right)x+\frac{1}{(x\log x)^2}+\cos ec^2x+\frac{49}{(7x+1)^2}$

Answer: A

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64. If $f(x)=\begin{vmatrix}\cos x & 1 & 0\\ 1 & 2\cos x & 1\\ 0 & 1 & 2\cos x\end{vmatrix}$ then $\int_0^{\pi/2} f(x)dx=$

A. $\cos 3x$

B. $\cos(\pi+3x)$

C. $\sin 3x$

D. $\sin(\pi+3x)$

Answer: B

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65. The angle between the curves $y^2=8(x+4)$ and $y^2=24(4-x)$ is

A. $\tan^{-1}\left(\frac{1}{6}\right)$

B. $\tan^{-1}(3)$

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

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

Answer: C

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66. The function $f(x) = x^{1/x}$ for $x > 0$, is

A. increasing in $(1, \infty)$

B. $decrea\sin g \in$ (1, infty)`

C. increasing in $(1, \theta)$ and decreasing in (θ, ∞)

D. decreasing in $(1, \theta)$ and increasing in (θ, ∞)

Answer: C

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67. Let $f: \left[0, \frac{1}{2}\right] \to R$ be given by $f(x) = x(x-1)(x-2)$. The value 'c', when Lagrange's mean-value theorem is applied for f(x), is

A. $\frac{\sqrt{21}}{6}$

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

C. $1-\frac{\sqrt{21}}{6}$

D. $1\pm\frac{\sqrt{21}}{6}$

Answer: D

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68. If a tangent to the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1(a>b>0)$ having slope $\frac{1}{3}$ is a normal to the circle $x^2+y^2+2x+2y+1=0$, then the maximum value of ab is

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

B. 9

C. $\frac{4}{9}$

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

Answer: A

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69. $\int \frac{\sin^8 x - \cos^8 x}{1 - 2\sin^2 x + 2\sin^4 x} \text{dx} =$

A. $-\frac{1}{2}\sin 2x + c$

B. $-\sin 2x + c$

C. $\frac{1}{2}\sin 2x + c$

D. $\sin 2x + c$

Answer: A

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70. $\int \frac{2x^{12} + 5x^9}{(x^5 + x^3 + 1)^3} dx = \frac{x^p}{q(x^5 + x^3 + 1)^r} + c$, then $p - q - r$=

A. $\frac{x^8}{)}(1 + x^3 + x^5)^2 + c$

B. $\dfrac{x^{10}}{(1+x^3+x^5)^2}+c$

C. $\dfrac{x^{10}}{2(1+x^3+x^5)^2}$

D. $\dfrac{x^{8}}{2(1+x^3+x^5)^2}+c$

Answer: C

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71. $\int \dfrac{x^2+\cos^2 x}{(1+x^2)\sin^2 x}dx =$

A. $\cot x+\tan^{-1} x+c$

B. $\cot x-\tan^{-1} x+c$

C. $-\cot x+\tan^{-1} x+c$

D. $-\cot x-\tan^{-1} x+c$

Answer: D

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72. If

$$I_n = \int \sin^n x dx, \quad \text{for} \quad n = 1, 2, 3 \ldots \quad \text{then} \quad 8I_8 + 7(I_7 - I_6) - 6I_5 =$$

A. $-\sin^6 x \cos x(1 + \sin x) + c$

B. $\sin^8 x \cos x + \sin^5 x \cos x + c$

C. $-\sin^7 x \cos x(1 - \sin x) + c$

D. $-\cos^7 x \sin x(1 + \cos x) + c$

Answer: A

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73. $\lim_{n \to \infty} \dfrac{1 + 32 + 243 + \ldots + n^5}{n^6} =$

A. $\dfrac{1}{5}$

B. $\dfrac{1}{11}$

C. $\dfrac{1}{6}$

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

Answer: C

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74. Let $a > 1$ and $b > 1$. If f(t) is a periodic function of period T and $\int_0^{\infty} a^{-bi} f(t)dt = k\int_0^{T} a^{-bt} f(t)dt$ then k =

A. $\frac{a^{bT}}{T+1}$

B. $\frac{a^{-bT}}{a^{-bT}+1}$

C. $\frac{a^{bT}}{b^{aT}+1}$

D. $\frac{a^{bT}}{a^{bT}-1}$

Answer: D

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75. The area (in sq units) enclosed by the curves $y = \sin x + \cos x$ and $y = |\cos x - \sin x|$ over the interval $\left[0, \frac{\pi}{2}\right]$ is

A. $4 + 2\sqrt{2}$

B. $4 - 2\sqrt{2}$

C. $2 + 2\sqrt{3}$

D. $6 - 3\sqrt{2}$

Answer: B

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76. The degree and order respectively of the differential equation of the family of the curves respresented by $y = \sqrt{c(x + \sqrt{c})}$ are (Here, C is a parameter)

A. A 1, 3

B. B 2, 3

C. C 3, 1

D. D 2, 2

Answer: C

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77. The solution of the differential equation $\frac{x+y-1}{x+y-2}\frac{dy}{dx}=\frac{x+y+1}{x+y+2}$, given that y = 1 when x = 1, is

A. $2(y-x)+\log\left|\frac{(x+y)^2-2}{2}\right|=0$

B. $\log\left|\frac{(x+y)^2-2}{2}\right|=(x-y)^2$

C. $\log\left|\frac{(x-y)^2+2}{2}\right|+2(y-x)=0$

D. $(x-y)+\log\left|\frac{(x+y)^2-2}{2}\right|=0$

Answer: A

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