MATHS

BOOKS - TS EAMCET PREVIOUS YEAR PAPERS

TS EAMCET 2019 (6 MAY SHIFT 1)

Mathematics

1. Let $f: X \to Y$ be a function and $A_y = \left\{ \frac{f^{-1}(y)}{y \in Y} \right\}$ Then $A_i \cap A_i = \phi(i \neq j) \forall i, j \in Y$ and $\cup_{y \in y} A_y = X$, if

A. f is onto function only

B. f is one-one function only

C. f is any fuction

D. X and Y are finite sets only

Answer: C

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2. If [x] represent greatest interger $\leq x$ and $[\alpha, \beta]$ is the set of all real values of x for which the real function $f(x) = \dfrac{\sqrt{3+x}+\sqrt{3-x}}{\sqrt{[x]+2}}$ is defined then $f^2(\alpha+1)+5f^2(\beta) =$

A. 0

B. $\dfrac{36}{5}$

C. 12

D. 1

Answer: C

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3. If α and β are the least positive integers such that for all $n \in N, n^3 + \alpha n$ is divisible by 3 and $n^3 - \beta n$ is divisible by 6 then $\alpha + \beta =$

A. 4

B. 3

C. 2

D. 1

Answer: B

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4. If $\begin{vmatrix} n^2 & (n+1)^2 & (n+2)^2 \\ (n+1)^2 & (n+2)^2 & (n+3)^2 \\ (n+2)^2 & (n+3)^2 & (n+4)^2 \end{vmatrix} = \Delta$ and $\begin{vmatrix} 1 & -4 & 7 \\ -2 & 3 & -5 \\ 3 & x & -3 \end{vmatrix} = 2\Delta + 1,$ then x=

A. 3

B. 4

C. 5

D. 6

Answer: A

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5. If M and N are square matrices order 3, then which one of the following statements is not true?

A. For all symmetric matrices M and N, MN-NM is skew symmetric

B. MN MN is symmetric or skew symmetric according as M is symmetric or skew symmetric

C. For all symmetric matrices M and N, matrix MN is symmertic

D. For any two matrices M and N, adj (MN) and adj (NM) need not be equal

Answer: C

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6. If the system of homogeneous equations

$tx + (t+1)y + (t-1)z = 0$

$(t+1)x + ty + (t+2)z = 0$

$(t-1)x + (t+2)y + tz = 0$ in x,y,z has a non-trivial solution, then t is a root of the equation

A. $3t^2 - 4t + 1 = 0$

B. $2t^2 - 3t + 1 = 0$

C. $2t^2 + 3t + 1 = 0$

D. $3t^2 + 4t + 1 = 0$

Answer: C

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7. The locus of a point on the argand plane represented by the complex number z, when z satisfies the condition

$$\left|\frac{z-1+i}{z+1-i}\right| = \left|Re\left(\frac{z-1+i}{z+1-i}\right)\right|$$ is

A. A straight line that does not contain the point (-1+i)

B. A circle that does not contain the point (-1+i)

C. A parabola that does not contain the point (-1+i)

D. A hyperbola that does not contain the point (-1+i)

Answer: A

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8. The sum of the products of the non-conjugate root of $i^{-1/4}$ taken two at a time is

A. 2

B. 0

C. -1

D. -2

Answer: B

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9. If $z = \cos\alpha + i\sin\alpha, 0 < \alpha < \frac{\pi}{4}$ then $\left|\frac{1+z^4}{1-z^3}\right|$

A. $\frac{\cos 2\alpha}{\sin\frac{3}{2}\alpha}$

B. $\frac{\cos\alpha}{\sin\frac{3}{2}\alpha}$

C. $\frac{\cos 2\alpha}{\sin \frac{\alpha}{2}}$

D. $\frac{\cos \alpha}{\sin \frac{\alpha}{2}}$

Answer: A

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10. If $1, \omega, \omega^2, \ldots\ldots. \omega^8$ are the roots of the equation

$$= x^9 - 1 = 0, \quad \text{then } \sum_{r=1}^{8} (\omega^r)^{99} =$$

A. 0

B. 8

C. 1

D. ω

Answer: B

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11. If α_1, α_2 are the roots of $x^2 + ax + 1 = 0$ and α_3, α_4 are the roots of $x^2 + bx + 1 = 0$ then $(\alpha_1 + \alpha_3)(\alpha_2 + \alpha_3)(\alpha_1 + \alpha_2)(\alpha_2 + \alpha_4) =$

A. $3a^2 - b^2$

B. $a^2 - 3b^2$

C. $(a - b)^2$

D. $(a + b)^2$

Answer: D

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12. Consider the curves given by the following quadratic function.

$f_1(x) = 5x^2 + 2x + 1, f_2(x) = 5x^2 + 6x + 1$

$f_3(x) = x^2 - 7x + 6, f_4(x) = 64x^2 + 48x + 9$

If A_1, A_2, A_3 and A_4 denote the lengths of the intercepts on the X-axis made by the above curve respectively, then which of the following is true?

A. $A_1 > A_2 > A_3 > A_4 > 0$

B. $A_4 < A_2 < A_3$

C. $A_3 < A_2 < A_4$

D. $A_2 < A_4 < A_3$

Answer: B

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13. The condition to be satisfied in order that one root of $x^3 + bx^2 + cx + d = 0$ is the sum of the other two roots is

A. $3d^2 + b^3 = b^2c$

B. $6d + b^3 = 2bc$

C. $8d + b^3 = 4bc$

D. $8d + b^2 = 4bc$

Answer: C

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14. If each root of the equation $2x^3 + ax^2 - 8x + b = 0$ is reduced by one, then in the transformed equation thus formed, the term containing x^2 and the constant term are vanishing. The roots of the original equation are

A. 1,-3,2

B. $1, 1 \pm \sqrt{7}$

C. 1,1,-6

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

Answer: B

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15. The number of different permutations of letters that can be formed by taking 4 letters at a time from the letters of the word REPETITION is

A. 210

B. 720

C. 1398

D. 5040

Answer: C

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16. If $n = (210)^2(360)(143)$, then the total number of non trivial factors of n is

A. 256

B. 872

C. 1504

D. 1438

Answer: D

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17. If p is an integral multiple of 4 lying in between the coefficients of x^4 and x in the expansion of $\left(x^2 + \frac{1}{x}\right)^8$, then the number of such values of p is

A. 3

B. 4

C. 5

D. 6

Answer: A

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18. If the ratio of the 7th term from the beginning to the 7th term from the end in the expansion of $\left(\sqrt{2}+\frac{1}{\sqrt{3}}\right)^{x}$ is $\frac{1}{6}$, then x is

A. 6

B. 8

C. 9

D. 12

Answer: C

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19. If $\frac{3x^4+5x^2+2}{(x^2+1)^2(x^2+2)} = \frac{Ax+B}{x^2+2} + \frac{Cx+D}{x^2+1} + \frac{Ex+F}{(x^2+1)^2}$ then

A +2B+D+4E=

A. 5

B. 0

C. 1

D. 7

Answer: D

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20. If $\sin 2\theta$ and $\cos 2\theta$ are solution of $x^2+bx-c=0$ then

A. $b^2+2c+1=0$

B. $b^2+2c-1=0$

C. $b^2-2c+1=0$

D. $b^2 - 2c - 1 = 0$

Answer: B

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21. If $\cot\theta + \tan\theta = 3$ and $1 - \cos^2\theta - \alpha\cos\theta = 0$, then

A. $6\alpha^2(9 - \alpha^2) = 1$

B. $6\alpha^2(\alpha^2 - 9) = 1$

C. $9\alpha^2(6 - \alpha^2) = 1$

D. $9\alpha^2(\alpha^2 - 6) = 1$

Answer: C

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22. If $\sin x + \sin y = p, \cos x + \cos y = q$ then $\sec(x + y) =$

A. $\dfrac{2pq}{p^2 + q^2}$

B. $\dfrac{p^2 + q^2}{q^2 - p^2}$

C. $\dfrac{2pq}{\sqrt{p^2 + q^2}}$

D. $\dfrac{p + q}{p^2 + q^2}$

Answer: B

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23. The number of solutions of the equation $\sin A - 5 \sin 2A + \sin 3A$

A. 1

B. 2

C. 3

D. 4

Answer: B

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24. If x_1, x_2, x_3 are the real roots of the equation $x^3 - x^2 \tan\theta + x\tan^2\theta + \tan\theta = 0$ and $0 < \theta < \frac{\pi}{4}$ then the value of $\tan^{-1}x_1 + \tan^{-1}x_2 + \tan^{-1}x_3$ at $\theta = \frac{\pi}{12}$ is

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

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

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

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

Answer: A

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25. If y=$\log_e$ tan $\left(\frac{\pi}{4}+\frac{x}{2}\right)$ then tan h $\frac{y}{2}=$

A. $\cot\frac{x}{2}$

B. $\tan x$

C. $\coth x$

D. $\tan\frac{x}{2}$

Answer: D

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26. In a ΔABC if a+3b=3c then $\sin\frac{A}{2}$

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

B. $\frac{a}{3}\sqrt{\frac{2}{bc}}$

C. $\frac{2a}{3}\sqrt{\frac{1}{bc}}$

D. $\frac{ab}{3}\sqrt{\frac{2}{c}}$

Answer: B

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27. Let one of the sides of a triangle be 17 cm and the sum of all the sides of the triangle be 40 cm. If the sum of two adjacent sides is 35 cm, then the area (in sq. cms) of the triangle is

A. $15\sqrt{2}$

B. $20\sqrt{2}$

C. $30\sqrt{2}$

D. $35\sqrt{2}$

Answer: C

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28. If the perimeter of the triangle ABC is 50 cm then $b\cos^2\frac{C}{2}+c\cos^2\frac{B}{2}=$

A. 20

B. 25

C. 30

D. 35

Answer: B

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29. If P, Q, R and S are the points with position vectors $\hat{i}+\hat{j}+\hat{k}, 2\hat{i}+5\hat{j}, 3\hat{i}+2\hat{j}-3\hat{k}$ and $\hat{i}-6\hat{j}-\hat{k}$ respectively, then the angle between PQ and RS is

A. 0

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

C. π

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

Answer: A

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30. If the plane passing through the points $\hat{i}+\hat{j}+\hat{k}, 2\hat{i}-\hat{k}$ and the origin meets the line passing through the points $\hat{i}+3\hat{j}-2\hat{k}$ and $\hat{i}-\hat{j}+3\hat{k}$ at the points A, then A=

A. $\frac{1}{9}\left(9\hat{i}-8\hat{j}+7\hat{k}\right)$

B. $\frac{1}{11}\left(11\hat{i}+9\hat{j}+8\hat{k}\right)$

C. $\frac{1}{11}\left(11\hat{i}-9\hat{j}+8\hat{k}\right)$

D. $\frac{1}{11}\left(11\hat{i}+9\hat{j}-8\hat{k}\right)$

Answer: B

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31. If the vector $19\hat{i}+22\hat{j}+5\hat{k}$ bisects an angle between the vectors a and $6\hat{i}+8\hat{j}$, then the unit vector in the direction of a is

A. $\frac{1}{5}\left(4\hat{i}+3\hat{j}\right)$

B. $\frac{1}{3}\left(2\hat{i}+2\hat{j}+\hat{k}\right)$

C. $\frac{1}{3}\left(\hat{i}+2\hat{j}+2\hat{k}\right)$

D. $\frac{1}{3}\left(2\hat{i}+2\hat{j}-\hat{k}\right)$

Answer: B

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32. Let $p = \hat{i} + 2\hat{j} - \hat{k}, q = 2\hat{i} - \hat{j} + \hat{k}$. If a and b are two vectors such that $p = a - 2b, q = 2a + b$, then the angle between a and b is

A. $\cos^{-1}\left(\frac{3}{2\sqrt{221}}\right)$

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

C. $\cos^{-1}\frac{7}{\sqrt{143}}$

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

Answer: A

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33. If $a = \hat{i} + \hat{j} + \hat{k}, a.b = 1$ and $a \times b = \hat{j} - \hat{k}$ then b=

A. $2\hat{i}$

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

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

D. $\hat{i}$

Answer: D

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34. The distance of the origin from the plane $r.\left(3\hat{i}+4\hat{j}-12\hat{k}\right)=7$ measured parallel to the line $r=\left(\hat{i}+2\hat{j}+3\hat{k}\right)+t\left(6\hat{i}+2\hat{j}+3\hat{k}\right)$ is

A. $\frac{45}{8}$

B. $\frac{49}{10}$

C. $\frac{7}{10}$

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

Answer: B

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35. If α, β, γ are the mean deviations about the mean, median and mode of the data $1, 2, 2, 3, 3, 3, 4, 6$ respectively, then

A. $\alpha < \beta < \gamma$

B. $\alpha = \beta = \gamma$

C. $\alpha \neq \beta = \gamma$

D. $\beta < \alpha < \gamma$

Answer: B

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36. The coefficient of variation for the following data is

x_i	5	7	9	11
f_i	3	2	1	2

A. $9\frac{\sqrt{23}}{2}$

B. $20\frac{\sqrt{23}}{3}$

C. $15\frac{\sqrt{23}}{4}$

D. $7\frac{\sqrt{23}}{6}$

Answer: B

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37. In a town the probability that a sick person may need to be admitted to an ICU is 10%. If the probability that a persion getting admitted to an ICU goes above 5%, then the threat level is raised. The minimum percentage of the population of the town that should fall sick in order to raise the threat level is

A. 15

B. 30

C. 50

D. 70

Answer: C

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38. A bag contains 6 red, 2 white and 8 blue balls. Three are drawn at random from the bag. Match the items of List-I with those items of List-II.

	List I		List II
A.	Probability that none of the balls is white	I.	$\frac{1}{70}$
B.	Probability of getting 2 white and 1 blue ball	II.	$\frac{6}{35}$
C.	Probability of getting 2 blue and 1 white ball	III.	$\frac{13}{20}$
D.	Probability of getting 1 red, 1 white and 1 blue ball	IV.	$\frac{1}{10}$
		V.	$\frac{2}{5}$

The correct match is

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

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

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

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

Answer: A

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39. A boy speaks truth in 3 out of 5 times. If he throws a die and tells that the number appeared on it is five, then the probability that it is actually five, is

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

B. $\frac{1}{10}$

C. $\frac{13}{30}$

D. $\frac{3}{13}$

Answer: D

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40. A fair coin is tossed a fixed number of times. If the probability of getting five heads is equal to that of getting seven heads, then the probability of getting four heads is

A. $\frac{495}{4096}$

B. $\frac{429}{2048}$

C. $\frac{165}{1024}$

D. $\frac{35}{512}$

Answer: A

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41. If a poisson variate X satisfies $P(X=2)=P(X=3)$ then $P(X=5)=$

A. $\frac{81}{40e^5}$

B. $\frac{81}{40e^3}$

C. $\frac{243}{40e^3}$

D. $\frac{243}{40e^5}$

Answer: B

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42. The ends of a rod of length l move on two mutually perpendicular lines. The locus of the point on the rod which divides it in the ratio 1 : 2 is

A. $3x^2+4y^2=2l^2$

B. $9x^2 + 16y^2 = 5l^2$

C. $4x^2 + 3y^2 = 6l^2$

D. $9x^2 + 36y^2 = 4l^2$

Answer: D

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43. The point P(1,4) occupies the positions A, B and C respectively after undergiong the following three transformation successively.

I. Reflection about the line y=x.

II. Translation about a distance of 1 unit along the positive direction of X-axis.

III. Rotation of the line OB through an angle $\frac{\pi}{4}$ about the origin in the anti-clockwise direction. Then the coordinates of C are

A. $(\sqrt{2}, 2\sqrt{2})$

B. $(2\sqrt{2}, 3\sqrt{2})$

C. $\left(\frac{5}{\sqrt{2}}, \frac{7}{\sqrt{2}}\right)$

D. $\left(\frac{2}{\sqrt{2}}, \frac{3}{\sqrt{2}}\right)$

Answer: B

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44. If the normal drawn from the origin to the straight line $2x + 7y + 6 = 0$ makes an angle θ with the postitive X-axis, then θ=

A. $\tan^{-1}\frac{7}{2}$

B. $\pi - \tan^{-1}\frac{7}{2}$

C. $\pi + \tan^{-1}\frac{7}{2}$

D. $-\tan^{-1}\frac{7}{2}$

Answer: C

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45. (x_1, x_2) is the point of concurrencey of a family of lines. If the algebraic sum of the lengths of the perpendicular drawn to these lines from $(2, 0)$, $(0, 2)$ and $(1, 1)$ is zero, then (x_1, y_1) =

A. (1,1)

B. (0,2)

C. (-1,1)

D. (1,2)

Answer: A

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46. If the line $3x + 4y + \lambda = 0$ divides the distance between the lines $3x + 4y + 5 = 0$ and $3x + 4y - 5 = 0$ in the ratio of 3:7 then a value of λ is

A. -2

B. 2

C. 0

D. 5

Answer: B

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47. Assertion (A) The lines $2x^2 + 5xy + 2y^2 = 0$ and $x - 2y + 1 = 0$ form a right angled triangle.

Reason R The equation $ax^2 + 2hxy + by^2 = 0$ represents a pair of perpendicular lines if a+b=0

The choose the correct answer

A. (A) is false, R is true

B. (A) is true, R is false

C. (A) is true, R is true, but R is not the correct explanation to (A)

D. (A) is true, R is true and R is the correct explanation to (A)

Answer: C

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48. The combined equation of the diagonals of the square formed by the pairs of lines

$xy + 6y - 4y - 24 = 0$ and $xy + 6y - 4y - 24 = 0$ is

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

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

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

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

Answer: A

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49. If the angle between a pair of tangents drawn from a point P to the circle

$x^2 + y^2 - 4x + 2y + 3 = 0$ is $\frac{\pi}{2}$ then the locus of P is

A. $x^2 + y^2 - 2x + 2y + 3 = 0$

B. $x^2 + y^2 - 8x + 4y + 2 = 0$

C. $x^2 + y^2 + 4x + 2y + 1 = 0$

D. $x^2 + y^2 - 4x + 2y + 1 = 0$

Answer: D

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50. If a variable circle S=0 touches the line y=x and passes through the point (0,0) then the fixed point that lies on the common chord of the circles $x^2+y^2+6x+8y-7=0$ is

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

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

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

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

Answer: A

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51. Two chords of the circle

$x^2+y^2-2gx-2hy+g^2+h^2-c^2=0$ are passing through the point (g,h+c) and the line y=x bisects these two chord. Then

A. $4g^2 - 4h^2 - 8gh + 4hc - 4cg - c^2 = 0$

B. $4g^2 + 4h^2 - 8gh + 4hc - 4cg - c^2 < 0$

C. $4g^2 + 4h^2 + 8gh + 4hc + 4cg + c^2 = 0$

D. $4g^2 + 4h^2 - 8gh + 4hc - 4cg - c^2 > 0$

Answer: B

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52. The centre of the circle passing through the point (1,1) and orthogonal to the circles

$x^2 + y^2 + 3x - 5y + 7 = 0$ and $x^2 + y^2 - 6x - 10y + 9 = 0$ is

A. $\left(-\frac{19}{52}, \frac{71}{52}\right)$

B. $\left(\frac{19}{52}, -\frac{55}{52}\right)$

C. $\left(-\frac{55}{52}, \frac{19}{52}\right)$

D. $\left(-\frac{19}{52}, \frac{55}{52}\right)$

Answer: D

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53. The length of the common chord of the circles $x^2 + y^2 - 6x - 4y + 9 = 0$ and $x^2 + y^2 - 8x - 6y + 23 = 0$ is

A. $\sqrt{2}$

B. 2

C. $2\sqrt{2}$

D. 4

Answer: C

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54. If y=mx+1 is tangent to the parabola $y^2 = 4x$ then m=

A. -1

B. 1

C. 2

D. -2

Answer: B

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55. If the line segment joining the vertex of the parabola $y^2 = 4ax$ and a point on the parabola, makes an angle θ with the positive X - axis, then the length of that line segment is

A. $\frac{4a \sin \theta}{\cos^2 \theta}$

B. $\frac{4a \cos \theta}{\sin^2 \theta}$

C. $4a \sin \theta. \cos^2 \theta$

D. $4a \cos \theta. \sin^2 \theta$

Answer: B

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56. The minimum length of the intercept between the coordinate axes made by a tangent of the ellipse $\frac{x^2}{64} + \frac{y^2}{4} = 1$ is

A. 10

B. $\frac{17}{2}$

C. 8

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

Answer: A::C

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57. An ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1(a>b)$ is inscribed in a rectangle of dimensilons 2a and 2b respectively, If the angle between the diagonals of the rectangle is $\tan^{-1}(4\sqrt{3})$, then the eccentricity of that ellipse is

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

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

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

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

Answer: B

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58. If $L_i=0$ and $L_2=0$ are the asymptotes of the hyperbola $9x^2-4y^2+36x+8y-4=0$ then the product of the perpendicular distances from the point (1,1) to the lines $L_i = 0$ and $L_2 = 0$ is

A. $\frac{32}{13}$

B. $\frac{64}{13}$

C. $\frac{81}{13}$

D. $\frac{162}{13}$

Answer: C

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59. The volume of the tetrahedron (in cubic units) formed by the plane $2x + y + z = k$ and the coordinate planes is $\frac{2V^3}{3}$ then K:V=

A. $1:2$

B. $1:6$

C. $4:3$

D. $2:1$

Answer: D

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60. The direction ratios of a bisector of the angle between two lines whose direction ratios are 1,1,2 and $\sqrt{3}, -\sqrt{3}, 0$ whose length is $\sqrt{6}$ are

A. $1+\sqrt{3}, 1-\sqrt{3}, 2$

B. $1-\sqrt{18}, 1+\sqrt{18}, 2$

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

D. 1,1,1

Answer: A

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61. Let $P(1, -2, 5)$ be the foot of the perendicular drawn from the origin to the plane π_1 and the same P be the foot of the perpendicular from (1,2,-1) to the planes, π_2. Then the acute angle between the planes π_1 and π_2 is

A. $\cos^{-1}\left(\frac{19}{\sqrt{390}}\right)$

B. $\cos^{-1}\left(\frac{19}{\sqrt{340}}\right)$

C. $\cos^{-1}\left(\frac{19}{\sqrt{370}}\right)$

D. $\cos^{-1}\left(\frac{19}{\sqrt{350}}\right)$

Answer: A

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62. $\lim_{x \to 0} \frac{\sqrt{x^2 + 100} - 10}{x^2} =$

A. 0

B. 0.1

C. 0.05

D. -0.05

Answer: C

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63. Let f and g be real-valued functions. If $\lim_{x \to 0} \frac{2f(x) - g(x)}{[(f(x)+7)]^{-2/3}} = \frac{7}{4}$, $\lim_{x \to 0} f(x) = 1$ and $\lim_{x \to 0} g(x) = \alpha$ then

$h(x) = \begin{cases} \sin(\alpha x) & 0 \leq x \leq \frac{\pi}{10} \\ \cos(2\alpha x) & \frac{\pi}{10} < x \leq \frac{\pi}{5} \end{cases}$ is

A. continuous at $x = \frac{\pi}{10}$ only

B. discontinuous on $\left[0, \frac{\pi}{5}\right]$

C. discontinuous at $x = \frac{\pi}{10}$

D. continuous on $\left[0, \frac{\pi}{5}\right]$

Answer: D

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64. If $\sqrt{\frac{y}{x}} + 4\sqrt{\frac{x}{y}} = 4, \text{then } \frac{dy}{dx} =$

A. xy

B. x / y

C. -4

D. 4

Answer: D

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65. If $y^{\cos x} = x^{\sin y}, \quad \text{then} \ \frac{dy}{dx} =$

A. $\frac{y(x \sin x \log y + \sin y)}{x(\cos x - y \log x \cos y)}$

B. $\frac{y(x \sin x \log x - \sin y)}{x(\cos x + y \log x \cos y)}$

C. $\frac{y(\sin y - x \log y)}{x(x - y \cos y(\log x))}$

D. $\frac{y(\sin y + x \log y)}{x(x + y \cos y(\log x))}$

Answer: A

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66. If $\sqrt{x+y} + \sqrt{y-x} = c$, then $\frac{d^2y}{dx^2}$ =

A. $\frac{1}{y}\left(\frac{dy}{dx}\right)^2$

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

C. $y\left(\frac{dy}{dx}\right)^2$

D. $\frac{-c^2}{4y^3}$

Answer: B

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67. The coordinates of the point P on the curve $x=a(\theta+\sin\theta), y=a(1-\cos\theta)$ where the tangent is inclined at angle $\frac{\pi}{4}$ to the x-axis, are

A. $\left(a\left(\frac{\pi}{2}-1\right)a\right)$

B. $\left(a\left(\frac{\pi}{2}+1\right)a\right)$

C. $\left(a\frac{\pi}{2}, a\right)$

D. (a, a)

Answer: B

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68. Electric current is measured by tangent galvonometer, the current being proportional to the tangent of the angles θ of deflection. If the deflection is read as 45° and an error of 1% is made in reading it then the percentage error in the current is

A. π

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

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

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

Answer: B

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69. If the tangent drawn at a point P on the curve $y = 3x^2 - 5x + 7$ is parallel to its chord joining the points $(1, y_1)$ and $(2, y_2)$ on it, then the x-coordinates of the point P is

A. $\sqrt{2}$

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

C. $\frac{5}{4}$

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

Answer: B

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70. If the minimum value of $f(x) = 2x^2 + \alpha x + 8$ is the same as the maximum value of $g(x) = -3x^2 - 4x + \alpha^2$ then $\alpha^2 =$

A. $\frac{150}{27}$

B. $\frac{160}{27}$

C. $\frac{170}{27}$

D. $\frac{181}{27}$

Answer: B

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71. $\int \frac{dx}{4\sin x + 3\cos x} =$

A. $\frac{1}{5}\log\left|\sec\left(x - \tan^{-1}\frac{4}{3}\right)\right| + c$

B. $\frac{1}{5}\log\left|\tan\left(\frac{\pi}{4} - x + \tan^{-1}\frac{4}{3}\right)\right| + c$

C. $\frac{1}{5}\log\left|\sec\left(x - \tan^{-1}\frac{4}{3}\right) + \tan\left(x - \tan^{-1}\frac{4}{3}\right)\right| + c$

D. $\frac{1}{5}\log\left|\cos ec\left(x - \tan^{-1}\frac{4}{3}\right) + \cot\left(x + \tan^{-1}\frac{4}{3}\right)\right| + c$

Answer: C

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72. If $\int \frac{\sqrt{2}(dx)}{\cos x\sqrt{\sin 2x}} = f(x) + c,$ then f(x)=

A. $2\sqrt{\sec x}$

B. $\sqrt{\tan x}$

C. $2\sqrt{\tan x}$

D. $2\sqrt{2}\sqrt{\tan x}$

Answer: C

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73. $\int e^x\left(\frac{\sec^2 x + \tan x - \cot x}{\sin x}\right)dx =$

A. $e^x(\cos ecx + \cot x) + c$

B. $e^x\left(\frac{\sec^2 x + \tan x}{\sin x}\right) + c$

C. $e^x\left(\frac{1 + \tan^2 x}{\sin x}\right) + c$

D. $e^x(\cos ecx + \sec x) + c$

Answer: D

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74. $\int \frac{3\sin x + 5\cos x + 4}{\sin x + \cos x + 2} dx =$

A. $\log(\sin x + \cos x + 2) + 4x - 4\tan^{-1}\left(1 + \tan\frac{x}{2}\right) + c$

B. $\log(\sin x + \cos x + 2) + 4x - 4\sqrt{2}\tan^{-1}\left(\frac{1 + \tan\frac{x}{2}}{\sqrt{2}}\right) + c$

C. $4\log(\sin x + \cos x + 2) + x - 4\sqrt{2}\tan^{-1}\left(\frac{1 + \tan\frac{x}{2}}{\sqrt{2}}\right) + c$

D. $4\log(\sin x + \cos x + 2) + 4x - 4\sqrt{2}\tan^{-1}\left(\frac{1 - \tan\frac{x}{2}}{\sqrt{2}}\right) + c$

Answer: B

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75. $\int_0^{\frac{\pi}{4}} \frac{\cos^2 x}{\cos^2 x + 4\sin^2 x} dx =$

A. $\frac{\pi}{4} + \frac{2}{3}\tan^{-1} 2$

B. $-\frac{\pi}{4}-\frac{2}{3}\tan^{-1}3$

C. $-\frac{\pi}{12}+\frac{2}{3}\tan^{-1}2$

D. $\frac{\pi}{4}-\frac{2}{3}\tan^{-1}4$

Answer: C

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76. $\lim_{n\to\infty}\left[\frac{n}{n^2+1}+\frac{n}{2^2+n^2}+\ldots\ldots\ldots+\frac{1}{2n}\right]$

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

B. $\log 2$

C. 0

D. 1

Answer: A

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77. The area (in square units) of the region bounded by the curve $y = |\sin 2x|$ and X-and in $[0, 2\pi]$ is

A. 0

B. 1

C. 3

D. 4

Answer: D

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78. The family of curves reprsented by the general solution of $y' = \frac{y}{2x}$ contains

A. circles

B. ellipses

C. hyperbolas

D. parabolas

Answer: D

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79. The solution of the differential equaltion $\left(x+2y^{3}\right)\frac{dy}{dx}=y$ is

A. $x=y^{3}+c$

B. $x=y^{3}+cy$

C. $y=x^{3}+c$

D. $y=x^{3}+cx+d$

Answer: B

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80. The solution of the differential equaltion $\frac{dy}{dx} = (4x + y + 1)^2$ when y(0)=1 is

A. $y = 2x^3 - 1 - \frac{\pi}{8}$

B. $y = 4x - \left(1 + \frac{\pi}{8}\right)$

C. $y = 2\tan\left(2x + \frac{\pi}{4}\right) - 4x - 1$

D. $y = 2\tan\left(x + \frac{\pi}{4}\right) + 4x - 1$

Answer: C

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