MATHS

BOOKS - TS EAMCET PREVIOUS YEAR PAPERS

TS EAMCET 2018 (4 MAY SHIFT 1)

Mathematics

1. Let $f: R \to R, g: R \to R$ be differentiable functions such that (fog)(x) = x. If $f(x) = 2x + \cos x + \sin^2 x$, then the value of $\sum_{n=1}^{99} g(1 + (2n-1)\pi)$ is

A. 1250π

B. $(99)^2 \frac{\pi}{2}$

C. $(99)^2 \pi$

D. 2500π

Answer: B

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2. If $f: [1, \infty) \to [1, \infty]$ is defined by

$f(x) = \dfrac{1 + \sqrt{1 + 4\log_2 x}}{2}$, then $f^{-1}(3) =$

A. 0

B. 1

C. 64

D. $\dfrac{1 + \sqrt{5}}{2}$

Answer: C

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3. If α and β are the greatest divisors of $n(n^2-1)$ and $2n(n^2+2)$ respectively for all $n \in N$, then $\alpha\beta =$

A. 18

B. 36

C. 27

D. 9

Answer: B

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4. Let $A = \begin{bmatrix} \frac{1}{6} & \frac{-1}{3} & \frac{-1}{6} \\ \frac{-1}{3} & \frac{2}{3} & \frac{1}{3} \\ \frac{-1}{6} & \frac{1}{3} & \frac{1}{6} \end{bmatrix}$. If $A^{2016l} + A^{2017m} + A^{2018n} = \frac{1}{\alpha}A$, for every $l, m, n \in N$, then the value of α is

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

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

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

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

Answer: B

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5. Let $l, m, n \in R$ and $A = \begin{bmatrix} 1 & r & r^2 & l \\ r & r^2 & 1 & m \\ r^2 & 1 & r & n \end{bmatrix}$. Then, the set of all real values of r for which the rank of A is 3, is

A. $(0, \infty)$

B. R

C. $R - \{1\}$

D. $R - \{0\}$

Answer: C

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6. The following system of equations $x + y + z = 9$, $2x + 5y + 7z = 52$ and $x + 7y + 11z = 77$ has

A. no solution

B. exactly 2 solution

C. only one solution

D. infinitely many solutions

Answer: D

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7. Z is a complex number such that $|z| \leq 2$ and $-\frac{\pi}{3} \leq \text{amp Z} \leq \frac{\pi}{3}$.

The area of the region formed by locus of Z is

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

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

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

D. $\frac{8\pi}{3}$

Answer: C

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8. The points in the argand plane given by

$Z_1 = -3+5i, Z_2 = -1+6i, Z_3 = -2+8i, Z_4 = -4+7i$

form a

A. parallelogram

B. rectangle

C. rhombus

D. square

Answer: D

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9. When $n=8, \left(\sqrt{3}+i\right)^n+\left(\sqrt{3}-i\right)^n=$

A. -256

B. -128

C. 256 i

D. 128 i

Answer: A

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10. If $2 \quad \text{cis} \quad \frac{7\pi}{5}$ is one of the values of $z^{1/5}$, then z =

A. $32 + 32i$

B. -32

C. -1

D. 32

Answer: B

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11. The set of real values of x for which the inequality $|x-1| + |x+1| < 4$ always holds good is

A. $(-2, 2)$

B. $(-\infty, -2) \cup (2, \infty)$

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

D. $(-2, -1) \cup (1, 2)$

Answer: A

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12. If the roots of the equation $x^2 + x + a = 0$ exceed a, then

A. Option1 $a > 2$

B. Option2 $a < -2$

C. Option3 $2 < a < 3$

D. Option4 $-2 < a < -1$

Answer: B

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13. If the roots of the equation $\sqrt{\frac{x}{1-x}}+\sqrt{\frac{1-x}{x}}=\frac{5}{2}$ are p and $q(q>q)$ and the roots of the equation $(p+q)x^4-pqx^2+\frac{p}{q}=0$ are $\alpha, \beta, \gamma, \delta,$ then $\left(\sum\alpha\right)^2-\sum\alpha\beta+\alpha\beta\gamma\delta=$

A. 0

B. $\frac{104}{25}$

C. $\frac{25}{4}$

D. $\frac{16}{5}$

Answer: B

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14. The equation $x^5-5x^3+5x^2-1=0$ has three equal roots. If α, β are the other two roots of this equation, then $\alpha+\beta+\alpha\beta=$

A. -4

B. 3

C. -2

D. -5

Answer: C

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15. If all possible numbers are formed by using the digits 1, 2, 3, 5, 7 without repetition and they are arranged in descending order, then the rank of the number 327 is

A. 31

B. 175

C. 149

D. 271

Answer: D

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16. If a is the number of all even divisors and b is the number of all odd divisors of the number 10800, then $2a + 3b =$

A. 72

B. 132

C. 96

D. 136

Answer: B

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17. If the coefficient of x^5 in the expansion of $\left(ax^2 + \frac{1}{bx}\right)^{13}$ is equal to the coefficient of x^{-5} in the expansion of $\left(ax - \frac{1}{bx^2}\right)^{13}$, then ab =

A. -1

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

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

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

Answer: A

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18. For $n \in N$, in the expansion of $\left(\sqrt[4]{x^{-3}} + a\sqrt[4]{x^5}\right)^n$, the sum of all binomial coefficients lies between 200 and 400 and the term independent of x is 448. Then, the value of a is

A. 1

B. 2

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

D. 0

Answer: B

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19. If $\frac{x^4 + x^3 + 2x^2 - 2x + 1}{x^3 + x^2}$
$= P(x) + \frac{A}{x} + \frac{B}{x^2} + \frac{C}{x+1}$, then $A + B + C =$

A. P(0)

B. P(2)

C. P(3)

D. P(4)

Answer: C

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20. If $A(n) = \sin^n \alpha + \cos^n \alpha$, then

$A(1)A(4) + A(2) + A(5)$=

A. $A(1)A(2) + A(4)A(5)$

B. $A(1)A(6) + A(2)A(3)$

C. $A(1)A(3) + A(2)A(6)$

D. $A(1)A(2) + A(3)A(6)$

Answer: B

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21. When $\dfrac{\sin 9\theta}{\cos 27\theta} + \dfrac{\sin 3\theta}{\cos 9\theta} + \dfrac{\sin \theta}{\cos 3\theta} = k$ $(\tan 27\theta - \tan \theta)$ is defined, then k =

A. $\dfrac{\pi}{2}$

B. $-\dfrac{1}{2}$

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

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

Answer: C

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22. If $0 < \theta < \dfrac{\pi}{2}, x = \sum_{n=0}^{\infty} \cos^{2n}\theta, y = \sum_{n=0}^{\infty} \sin^{2n}\theta,$ and $z = \sum_{n=0}^{\infty} \cos^{2n}\theta \sin^{2n}\theta$ then show that

(i) $xyz = xy + z$ (ii) $xyz = x + y + z$

A. $xz + yz = xy + z$

B. $xyz = yz + x$

C. $xy + z = xy + zx$

D. $x + y + z = xyz + z$

Answer: A

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23. Number of solutions of the equation $\sin x - \sin 2x + \sin 3x = 2\cos^2 x - 2\cos x$ is $(0, \pi)$ is

A. 1

B. 3

C. 2

D. 4

Answer: C

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24. $2\tan^{-1}\frac{1}{5}+\sec^{-1}\frac{5\sqrt{2}}{7}+\tan^{-1}\frac{1}{8}=$

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

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

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

D. $\frac{\pi}{8}$

Answer: B

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25. If $\cos hx=\frac{\sqrt{14}}{3}, \sin hx=\cos\theta$ and $-\pi<\theta<-\frac{\pi}{2}$, then $\sin\theta=$

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

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

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

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

Answer: D

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26. In ΔABC, if $a = 5$ and $\tan\left(\frac{A-B}{2}\right) = \frac{1}{4}\tan\left(\frac{A+B}{2}\right)$, then $\sqrt{a^2 - b^2}$=

A. 2

B. 3

C. 4

D. 5

Answer: C

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27. In a ΔABC, if A = 2B and the sides opposite to the angles A, B, C are $\alpha + 1$, $\alpha - 1$ and α respectively, then α =

A. 3

B. 4

C. 5

D. 6

Answer: C

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28. In ΔABC, right angled at A, the circumradius, inradius and radius of the cxcircle opposite to A are respectively in the ratio

$2:5:\lambda$, then the roots of the equation

$x^2-(\lambda-5)x+(\lambda-6)=0$ are

A. 3, 4

B. 5, 13

C. 1, 3

D. 8, 13

Answer: C

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29. Let $3\hat{i}+\hat{j}-\hat{k}$ be the position vector of a point B. Let A be a point on the line which is passing through B and parallel to the vector $2\hat{i}-\hat{j}+2\hat{k}$. If $|BA|=18$, then the position vector of A is

A. $-9\hat{i}+7\hat{j}-13\hat{k}$

B. $-9\hat{i}+3\hat{j}+12\hat{k}$

C. $9\hat{i} - 3\hat{j} + 2\hat{k}$

D. $3\hat{i} - \hat{j} + 7\hat{k}$

Answer: A

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30. The vector that is parallel to the vector $2\hat{i} - 2\hat{j} - 4\hat{k}$ and coplanar with the vectors $\hat{i} + \hat{j}$ and $\hat{j} + \hat{k}$ is

A. $\hat{i} - \hat{k}$

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

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

D. $3\hat{i} + 3\hat{j} + 6\hat{k}$

Answer: C

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31. A line L is passing through the point A whose position vector is $\hat{i}+2\hat{j}-3\hat{k}$ and parallel to the vector $2\hat{i}+\hat{j}+2\hat{k}$. A plane π is passing through the points $\hat{i}+\hat{j}+\hat{k}$, $\hat{i}-\hat{j}-\hat{k}$ and parallel to the vector $\hat{i}-2\hat{j}$. Then, the point where this plane π meets the line L is

A. $\frac{1}{7}\left(15\hat{i}+18\hat{j}-9\hat{k}\right)$

B. $7\hat{i}+\hat{j}-19\hat{k}$

C. $3\hat{i}+3\hat{j}-\hat{k}$

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

Answer: A

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32. If the position vectors of three points A, B, C respectively are $\hat{i}+2\hat{j}+\hat{k}$, $2\hat{i}-\hat{j}+2\hat{k}$ and $\hat{i}+\hat{j}+2\hat{k}$, then the perpendicular distance of the point C from the line AB is

A. $\sqrt{\frac{3}{11}}$

B. $\sqrt{\frac{4}{11}}$

C. $\sqrt{\frac{6}{11}}$

D. $\sqrt{\frac{8}{11}}$

Answer: C

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33. The volume of a tetrahedron whose vertices are $4\hat{i}+5\hat{j}+\hat{k},\ -\hat{j}+\hat{k}, 3\hat{i}+9\hat{j}+4\hat{k}$ and $-2\hat{i}+4\hat{j}+4\hat{k}$ is (in cubic units)

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

B. 5

C. 6

D. 30

Answer: B

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34. If the vectors b, c, d are not coplanar, then the vector $(a \times b) \times (c \times d) + (a \times c) \times (d \times b) + (a \times d) \times (b \times c)$ is

A. parallel to a

B. parallel to b

C. parallel to c

D. perpendicular to a

Answer: A

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35. $x_1, x_2, \ldots.., x_n$ are n observations with mean $\vec{x}$ and standard deviation σ. Match the items of List - I with those of List - II

List-I	List-II
A $\sum_{i=1}^{n}(x_i - \bar{x})$	(i) Median
B Variance (σ^2)	(ii) Coefficient of variation
C Mean deviation	(iii) Zero
D Measure used to find the homogeneity of given two series	(iv) Mean of the absolute deviations from any measure of central tendency
	(v) Mean of the squares of the deviations from mean

The correct answer is

A. $\begin{array}{llll} A & B & C & D \\ \text{(i)} & \text{(v)} & \text{(ii)} & \text{(iii)} \end{array}$

B. $\begin{array}{llll} A & B & C & D \\ \text{(i)} & \text{(iv)} & \text{(iii)} & \text{(ii)} \end{array}$

C. $\begin{array}{llll} A & B & C & D \\ \text{(iii)} & \text{(v)} & \text{(iv)} & \text{(ii)} \end{array}$

D. $\begin{array}{llll} A & B & C & D \\ \text{(iii)} & \text{(v)} & \text{(ii)} & \text{(i)} \end{array}$

Answer: C

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36. The variance of 50 observations is 7. If each observation is multiplied by 6 and then 5 is subtracted from it, then the variance of the new data is

A. 37

B. 42

C. 247

D. 252

Answer: D

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37. Two dice are thrown and two coins are tossed simultaneously. The probability of getting prime numbers on both the dice along with a head and a tail on the two coins is

A. $\frac{1}{8}$

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

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

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

Answer: A

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38. 5 persons entered a lift cabin on the ground floor of a 7 floor house. Suppose, that each of them independently and with equal probability can leave the cabin at any floor beginning with the first.

The probability of all the 5 persons leaving the cabin at different floors, is

A. $\frac{360}{2401}$

B. $\frac{5}{54}$

C. $\frac{5}{18}$

D. $\frac{5!}{7!}$

Answer: B

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39. A company produces 10000 items per day. On a particular day 2500 items were produced on machine A, 3500 on machine B and 4000 on machine C. The probability that an item produced by the machines A, B, C to be defective is respectively 2%, 3% and 5%. If one item is selected at random from the output and is found to be defective, then the probability that it was produced machine C, is

A. $\frac{10}{71}$

B. $\frac{16}{71}$

C. $\frac{40}{71}$

D. $\frac{21}{71}$

Answer: C

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40. A randdom variable X takes the values 1, 2, 3 and 4 such that $2P(X = 1) = 3P(X = 2) = P(X = 3) = 5P(X = 4)$. If σ^2 is the variance and μ is the mean of X. Then, $\sigma^2 + \mu^2 =$

A. $\frac{421}{61}$

B. $\frac{570}{61}$

C. $\frac{149}{61}$

D. $\frac{3480}{3721}$

Answer: A

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41. An executive in a company makes on an average 5 telephone calls per hour at a cost of Rs. 2 per cell. The probability that in any hour the cost of the calls exceeds a sum of Rs. 4 is

A. $\frac{2e^4 - 35}{2e^5}$

B. $\frac{2e^5 - 37}{2e^5}$

C. $1 - \frac{37}{e^4}$

D. $1 - (18.5)e^5$

Answer: B

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42. A quadrilateral ABCD is divided by the diagonal AC into two triangles of equal areas. If A, B, C are respectively, $(3, 4), (-3, 6), (-5, 1)$, then the locus of D is

A. $(x - 8y - 57)(x - 8y + 11) = 0$

B. $(x - 8y - 57)(x - 8y - 11) = 0$

C. $(3x - 8y - 57)(3x - 8y + 11) = 0$

D. $(3x - 8y - 11)(3x - 8y + 57) = 0$

Answer: D

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43. By rotating the coordinate axes in the positive direction about the origin by an angle α, if the point (1, 2) is transformed to $\left(\frac{3\sqrt{3}-1}{2\sqrt{2}}, \frac{\sqrt{3}+3}{2\sqrt{2}}\right)$ in new coordinate system Then, α =

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

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

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

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

Answer: D

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44. Let $a \neq 0, b \neq 0,$ c be three real numbers and $L(p, q) = \frac{ap + bq + c}{\sqrt{a^2 + b^2}}, f \text{ or } allp, q \in R.$

If $L\left(\frac{2}{3}, \frac{1}{3}\right) + L\left(\frac{1}{3}, \frac{2}{3}\right) + L(2, 2) = 0,$ then the line $ax + by + c = 0$ always passes through the fixed point

A. $(0, 1)$

B. $(1, 1)$

C. $(2, 2)$

D. $(-1, -1)$

Answer: B

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45. The incentre of the triangle formed by the straight line having 3 as X-intercept and 4 as Y-intercept, together with the coordinate axes, is

A. (2, 2)

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

C. (1, 2)

D. (1, 1)

Answer: D

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46. The equation of the straight line in the normal form which is parallel to the lines $x + 2y + 3 = 0$ and $x + 2y + 8 = 0$ and dividing the distance between there two lines in the ratio 1 : 2 internally is

A. $x \cos \alpha + y \sin \alpha = \dfrac{10}{\sqrt{45}}, \alpha = \tan^{-1} \sqrt{2}$

B. $x \cos \alpha + y \sin \alpha = \dfrac{14}{\sqrt{45}}, \alpha = \pi + \tan^{-1} 2$

C. $x \cos \alpha + y \sin \alpha = \dfrac{14}{\sqrt{45}}, \alpha = \tan^{-1} 2$

D. $x \cos \alpha + y \sin \alpha = \dfrac{10}{\sqrt{45}}, \alpha = \pi + \tan^{-1} \sqrt{2}$

Answer: B

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47. A pair of straight lines is passing through the point (1, 1). One of the lines makes an angle θ with the positive direction of X-axis and the other makes the same angle with the positive direction of Y-axis.

If the equation of the pair of straight lines is

$x^2 - (a+2)xy + y^2 + a(x+y-1) = 0, a \neq -2$, then the value of θ is

A. $\frac{1}{2}\sin^{-1}\left(\frac{2}{a+2}\right)$

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

C. $\frac{1}{2}\tan^{-1}\left(\frac{2}{a+2}\right)$

D. $\frac{1}{2}\tan\left(\frac{2}{a+2}\right)$

Answer: A

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48. If the pair of lines $6x^2 + xy - y^2 = 0$ and $3x^2 - axy - y^2 = 0, a > 0$ have a common line, then a =

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

B. 1

C. 2

D. 4

Answer: A

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49. If the chord $L \equiv y - mx - 1 = 0$ of the circle $S \equiv x^2 + y^2 - 1 = 0$ touches the circle $S_1 \equiv x^2 + y^2 - 4x + 1 = 0$, then the possible points for which L = 0 is a chord of contact of S = 0 are

A. $(2 \pm \sqrt{6}, 0)$

B. $(2 \pm \sqrt{6}, 1)$

C. $(2, 0)$

D. $(\sqrt{6}, 1)$

Answer: B

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50. If $y + c = 0$ is a tangent to the circle $x^2 + y^2 - 6x - 2y + 1 = 0$ at (a, 4), then

A. ac = 360

B. ac = -12

C. $a + c = 0$

D. $4a = c$

Answer: B

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51. If the circles given by

$S \equiv x^2 + y^2 - 14x + 6y + 33 = 0$ and

$S' \equiv x^2 + y^2 - a^2 = 0 (a \in N)$ have 4 common tangents, then the possible number of circles $S' = 0$ is

A. 1

B. 2

C. 0

D. infinite

Answer: B

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52. The centre of the circle passing through the point (1,0) and cutting the circles

$x^2 + y^2 - 2x + 4y + 1 = 0$ and

$x^2 + y^2 + 6x - 2y + 1 = 0$ orthogonally is

A. $\left(-\frac{2}{3}, \frac{2}{3}\right)$

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

C. (0, 1)

D. (0, 0)

Answer: D

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53. The equation of the tangent at the point (0, 3) on the circle which cuts the circles $x^2 + y^2 - 2x + 6y = 0$,

$x^2 + y^2 - 4x - 2y + 6 = 0$ and

$x^2 + y^2 - 12x + 2y + 3 = 0$ orthogonally is

A. y = 3

B. x = 0

C. $3x + y - 3 = 0$

D. $x + 3y - 9 = 0$

Answer: A

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54. If two tangents to the parabola $y^2 = 8x$ meet the tangent at its vertex in M and N such that MN = 4, then the locus of the point of intersection of those two tangents is

A. $y^2 = 8(x + 3)$

B. $y^2 = 8(x - 2)$

C. $y^2 = 8(x + 2)$

D. $y^2 = 4(x + 2)$

Answer: C

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55. Three normals are drawn from the point (c, 0) to the curve $y^2 = x$. If one of the normals is X-axis, then the value of c for which the other two normals are perpendicualr to each other is

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

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

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

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

Answer: C

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56. If the normal drawn at one end of the latus rectum of the ellipse $b^2x^2 + a^2y^2 = a^2b^2$ with eccentricity 'e' passes through one end of the minor axis. Then,

A. $e^4 + e^2 = 2$

B. $e^4 - e^2 = 1$

C. $e^4 + e^2 = 1$

D. $e^2 + e = 1$

Answer: C

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57. A variable tangent to the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ makes intercepts on both the axes. The locus of the middle point of the portion of the tangent between the coordinate axes is

A. $\frac{x^2}{b^2} + \frac{y^2}{a^2} = 1$

B. $\frac{a^2}{x^2} + \frac{b^2}{y^2} = 1$

C. $b^2x^2 + a^2y^2 = 4$

D. $\frac{a^2}{x^2} + \frac{b^2}{y^2} = 4$

Answer: D

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58. If the eccentricity of a conic satisfies the equation $2x^3 + 10x - 13 = 0$, then the conic is

A. a circle

B. a parabola

C. an ellipse

D. a hyperbola.

Answer: D

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59. Assertion (A) If $(-1, 3, 2)$ and $(5, 3, 2)$ are respectively the orthocentre and circumcentre of a triangle, then (3, 3, 2) is its centroid.

Reason (R) Centroid of the triangle divides the line segment joining the orthocentre and the circumcentre in the ratio 1 : 2.

Which one of the following is true ?

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

B. (A) and (R) are true, but (R) is not the correct explanation to (A)

C. (A) is true, (R) is false

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

Answer: C

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60. The lines whose direction cosines are given by the relations $al + bm + cn = 0$ and $mn + nl + lm = 0$ are

A. perpendicualr if $\frac{1}{a} + \frac{1}{b} + \frac{1}{c} = 0$

B. perpendicular if $\sqrt{a} + \sqrt{b} + \sqrt{c} = 0$

C. parallel if $\frac{1}{a} + \frac{1}{b} + \frac{1}{c} = 0$

D. parallel to $a + b + c = 0$

Answer: A

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61. If the plane passing through the points (1, 2, 3), (2, 3, 1) and (3, 1, 2) is $ax + by + cz = 1$, then $a + 2b + 3c =$

A. 0

B. 1

C. 6

D. 18

Answer: B

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62. $\lim_{x \to -\infty} \frac{3|x| - x}{|x| - 2x} - \lim_{x \to 0} \frac{\log(1 + x^3)}{\sin^3 x} =$

A. 1

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

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

D. 0

Answer: B

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63. If $f(x)=\begin{cases}\frac{x-2}{|x-2|}+a & x<2\\ a+b & x=2\\ \frac{x-2}{|x-2|}+b & x>2\end{cases}$

is continuous at x = 2, then $a+b=$

A. 2

B. 1

C. 0

D. -1

Answer: C

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64. If $f(x) = \begin{cases} \frac{x^2 \log(\cos x)}{\log(1+x^2)} & x \neq 0 \\ 0 & x = 0 \end{cases}$, then f is

A. discontinuous at zero

B. continuous but not differentiable at zero

C. differentiable at zero

D. not continuous and not differentiable at zero

Answer: C

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65. Match the items given in List-I with those of the items of List - II

List-I	List-II
(A) If $y = \lvert x\rvert + \lvert x-2\rvert$ then at $x = 2$, $\frac{dy}{dx} =$	(i) 2
(B) If $f(x) = \lvert\cos 2x\rvert$, then $f'\left(\frac{\pi^{+}}{4}\right) =$	(ii) 0
(C) If $f(x) = \sin\pi[x]$ where $[\cdot]$ denotes the greatest integer function, then $f'(1^{-}) =$	(iii) -2
(D) If $f(x) = \log\lvert x-1\rvert$, $x \neq 1$ then $f'\left(\frac{1}{2}\right) =$	(iv) does not exist
	(v) $\frac{1}{2}$

The correct answer is

A. $\begin{matrix} A & B & C & D \\ (v) & (iii) & (i) & (ii) \end{matrix}$

B. $\begin{matrix} A & B & C & D \\ (iv) & (ii) & (i) & (iii) \end{matrix}$

C. $\begin{matrix} A & B & C & D \\ (iv) & (i) & (ii) & (iii) \end{matrix}$

D. $\begin{matrix} A & B & C & D \\ (i) & (iii) & (iv) & (ii) \end{matrix}$

Answer: C

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66. If $y = \frac{\left(\sin^{-1} x\right)^2}{2}$, then $\left(1 - x^2\right) y_2 - x y_1 =$

A. y

B. 2y

C. 1

D. 2

Answer: C

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67. If the relative errors in the base radius and the height of a cone are same and equal to 0.02, then the percentage error in the volume of that cone is

A. 2

B. 4

C. 6

D. 8

Answer: C

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68. The normal at a point θ to the curve $x = a(1 + \cos\theta), y = a\sin\theta$ always passes through the fixed point

A. (0, a)

B. (2a, 0)

C. (a, 0)

D. (a, a)

Answer: C

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69. Let f(x) be continuous on [0, 6] and differentiable on (0, 6). Let f(0) = 12 and $f(6) = -4.$

If $g(x) = \frac{f(x)}{x+1}$, then for some Lagrange's constant $c \in (0, 6), g'(c) =$

A. $-\frac{44}{3}$

B. $-\frac{22}{21}$

C. $\frac{32}{21}$

D. $-\frac{44}{21}$

Answer: D

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70. If (α, β) and (γ, δ) where $\alpha < \gamma$, are the turning points of $f(x) = 2x^3 - 15x^2 + 36x - 8$, then $\alpha - \gamma - \beta + \delta =$

A. 0

B. -2

C. 2

D. 1

Answer: B

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71. The height of a cylinder of the greatest volume that can be inscribed in a sphere of radius 3 is

A. $3\sqrt{3}$

B. $2\sqrt{3}$

C. $\sqrt{3}$

D. $\sqrt{2}$

Answer: B

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72. $\int \frac{dx}{(e^x + e^{-x})^2} =$

A. $\frac{1}{2(e^{2x}+1)} + c$

B. $-\frac{1}{2(e^{2x}+1)} + c$

C. $\frac{1}{3(e^{2x}+1)} + c$

D. $-\frac{1}{(e^{2x}+1)} + c$

Answer: B

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73. $\int_0^{\pi/2} \frac{dx}{1+(\tan x)^{\sqrt{2018}}} =$

A. π

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

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

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

Answer: D

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74. If

$\int \frac{x}{(x^2+1)(x-1)} dx = A\log\left|x^2+1\right| + B\tan^{-1}x + C\log|x-1| + d$

, then $A+B+C=$

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

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

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

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

Answer: C

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75. $\int_0^{\pi/2} \frac{\cos^3 x}{\sin x + \cos x} dx =$

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

B. $\frac{\pi - 1}{4}$

C. $\frac{1 + \pi}{4}$

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

Answer: B

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76. $\int_0^3 (2+x^2)\,dx =$

A. $\lim_{n \to \infty} \frac{1}{n}\left[2n + \frac{1^2+2^2+\ldots+(3n)^2}{n^2}\right]$

B. $\lim_{n \to \infty} \frac{1}{n}\left[3n + \frac{1^2+2^2+\ldots+6n^2}{n^2}\right]$

C. $\lim_{n \to \infty} \frac{1}{n}\left[6n + \frac{1^2+2^2+\ldots+9n^2}{n^2}\right]$

D. $\lim_{n \to \infty} \frac{1}{n}\left[3n + \frac{1^2+2^2+\ldots+3n^2}{n^2}\right]$

Answer: C

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77. The area enclosed (in square units) by the curve $y = x^4 - x^2$, the X-axis and the vertical lines passing through the two minimum points of the curve is

A. $\frac{48\sqrt{2}}{5}$

B. $\frac{5}{48\sqrt{2}}$

C. $\frac{7}{60\sqrt{2}}$

D. $\frac{7}{30\sqrt{2}}$

Answer: D

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78. The differential equation corresponding to the family of circles having centres on X-axis and passing through the origin is

A. $y^2 + x^2 + \frac{dy}{dx} = 0$

B. $y^2 - x^2 + \frac{dy}{dx} = 0$

C. $y^2 + x^2 + 2xy\frac{dy}{dx} = 0$

D. $y^2 - x^2 - 2xy\frac{dy}{dx} = 0$

Answer: D

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79. The general solution of the differential equation $(x^2 + xy)y' = y^2$ is

A. $\frac{e^y}{x} = cx$

B. $e^{-\frac{y}{x}} = cy$

C. $e^{-\frac{y}{x}} = cxy$

D. $e^{-\frac{2y}{x}} = cy$

Answer: B

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80. At any point on a curve, the slope of the tangent is equal to the sum of abscissa and the product of ordinate and abscissa of that point. If the curve passes through (0, 1), then the equation of the curve is

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

B. $y = 2e^{x^2}$

C. $y = e^{-x^2}$

D. $y = 2e^{-x^2} - 1$

Answer: A

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