MATHS

BOOKS - TS EAMCET PREVIOUS YEAR PAPERS

TS EAMCET 2019 (4 MAY SHIFT 2)

Mathematics

1. Find the domain of the real function $f(x)=\dfrac{1}{\sqrt{[x]^2-[x]-2}}$.

A. $(-\infty, -2)\cup(1,\infty)$

B. $(-\infty, -2)\cup(0,\infty)$

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

D. $(-\infty, -1)\cup(3,\infty)$

Answer: D

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2. Let $f: R \to R$ and $g: R \to R$ be the functions defined by $f(x) = \frac{x}{1+x^2}$,

$x \in R, g(x) = \frac{x^2}{1+x^2}, x \in R$

Then, the correct statement (s) among the following is/are :

(a) both f.g are one-one

(b) both f.g are onto

(c) both f.g are not one-one as well as not onto

(d)f and g are onto but not one-one

A. A

B. A,B

C. D

D. C

Answer: D

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3. If

$\alpha \in R, n \in N$ and $n + 2(n-1) + 3(n-2) + \ldots\ldots + (n-1)2 + n.1 =$

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

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

C. $\frac{1}{5}$

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

Answer: D

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4. If the function $f: [a, b] \rightarrow \left[-\frac{\sqrt{3}}{4}, \frac{1}{2}\right]$ defined by

$$f(x) = \begin{vmatrix} 1 & 1 & 1 \\ 1 & 1+\sin x & 1 \\ 1+\cos x & 1 & 1 \end{vmatrix}$$

is one - one and onto , then

A. $a = \frac{-\pi}{4}, b = \frac{\pi}{6}$

B. $a = \frac{-\pi}{2}, b = \frac{\pi}{2}$

C. $a = \frac{-\pi}{6}, b = \frac{\pi}{4}$

D. $a = -\pi, b = \pi$

Answer: A

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5. The rank of the matrix

$$\begin{bmatrix} 3 & 5 & -1 & 4 \\ 2 & 1 & 3 & -2 \\ 8 & 11 & 1 & 6 \\ -7 & -14 & 6 & -14 \end{bmatrix}$$

A. 1

B. 2

C. 3

D. 4

Answer: B

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6. A value of e for which the following system of equations has a non-trivial solution is

$(4\sin\theta)x - 3y + z = 0, \; -(6\cos 2\theta)y + z = 0, 3x - 12y + 4z = 0$

A. $\tan^{-1}\left(\frac{1}{2}\right)$

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

C. $\sin^{-1}\left(\frac{3}{16}\right)$

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

Answer: C

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7. If $z = \sqrt{2}\sqrt{1 + \sqrt{3i}}$ represents a point P in the argand plane and P lies in the third quadrant, then the polar form of z is

A. $2\left[\cos\left(\frac{-4\pi}{3}\right) + i\sin\left(\frac{-4\pi}{3}\right)\right]$

B. $2\left[\cos\left(\frac{-5\pi}{6}\right) + i\sin\left(\frac{-5\pi}{6}\right)\right]$

C. $2\left[\cos\left(\frac{-\pi}{6}\right) + i\sin\left(\frac{-\pi}{6}\right)\right]$

D. $2\left[\cos\left(\frac{-2\pi}{3}\right) + i\sin\left(\frac{-2\pi}{3}\right)\right]$

Answer: B

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8. If z = x + iy represents a point P in the argand plane, then the area of the region represented by the inequality 2 <|z-(1+i)|<3 is

A. 49π

B. 36π

C. 25π

D. 5π

Answer: D

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9. If P is a complex number whose modulus is one, then the equation $\left(\frac{1+iz}{1-iz}\right)^4$ = P has

A. real and equal roots

B. real and distinct roots

C. two real and two complex roots

D. all complex roots

Answer: D

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10. $\sum_{r=1}^{16}\left(\sin\left[\frac{2r\pi}{17}\right]+i\cos\left[\frac{2r\pi}{17}\right]\right)$ =

A. 1

B. -1

C. i

D. $-i$

Answer: D

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11. If the maximum value of $2x-7-ax^2$ cannot exceed 20, then the minimum value of a is

A. 27

B. $\frac{1}{13}$

C. 13

D. $\frac{1}{27}$

Answer: D

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12. A student while solving a quadratic equation in x, he copied its constant term incorrectly and got its roots as 5 and 9. Another student copied the constant term and coefficient of x^2 of the same equation correctly as 12 and 4 respectively. Ifs,p and Δ denote respectively the sum of the roots, the product of the roots and the discriminate of the correct equation,

then $\frac{\Delta}{3p+s} =$

A. 48

B. 45

C. 8

D. 16

Answer:

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13. The product of the real roots of the equation $(x+1)^4 + (x+3)^4 = 8$ is

A. 0

B. 74

C. $7 - 2\sqrt{3}$

D. $7 + 2\sqrt{3}$

Answer: C

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14. The sum of all the real numbers satisfying the equation $x^2 + |x-3| = 4$ is

A. 0

B. 1

C. 2

D. -1

Answer: B

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15. Consider the following statement :

(i) Numberof one-one functions from set A to set B, where O(A) = m and O(B) =$n(m \leq n)$ is given by ^nP_m

(ii) Number of ways is which 'n' people can be arranged at a circular table is $\frac{(n-1)!}{2}$

(iii) Number of ways of selecting atleast one thing out of the given a distinct things is $2^n - 1$

(iv) Number of ways in which distinguishable objects can be distributed into k distinguishable bins is ${}^{n}C_{k-1}$

Then which one of the following is true?

A. All the statements are true

B. All except (iii) are true

C. Only (i) and (iii) are true

D. Only (iii) is false

Answer: C

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16. The number of ways is which 3 identical balls can be distributed into 7 distinct bins is

A. 49

B. 84

C. 35

D. 42

Answer: B

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17. Let $(1+x+x^2)^n = a_0 + a_1x + a_2x^2 + \ldots\ldots + a_{2n}x^{2n}$

Then match the items of List - I with those of List-II

	List I		List II
(A)	$a_0 + a_2 + \ldots + a_{2n}$	(I)	$n \cdot 3^{n-1}$
(B)	$a_1 + a_3 + \ldots + a_{2n-1}$	(II)	$n \cdot 3^n$
(C)	$a_1 + 2a_2 + 3a_3 + \ldots + 2na_{2n}$	(III)	$\frac{1}{2}(3^n + 1)$
		(IV)	$\frac{1}{2}(3^n - 1)$

The correct match is

A. $A \rightarrow (IV), B \rightarrow (I), C \rightarrow (III)$

B. $A \rightarrow (IV), B \rightarrow (III), C \rightarrow (I)$

C. $A \rightarrow (III), B \rightarrow (I), C \rightarrow (II)$

D. $A \to (III), B \to (IV), C \to (II)$

Answer: D

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18. For $x = \frac{5}{7}$, If t_k is the first negative term in the expansion of $(1+x)^{7/5}$, then $t_1, + t_2, + \ldots .. t_k =$

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

B. $\frac{107}{14}$

C. $\frac{104}{49}$

D. $\frac{921}{28}$

Answer: C

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19. The cofficient of x^6 in the tower series expansion of $\frac{x^4 - 12x^2 + 7}{(x^2 + 1)^3}$ is

A. 149

B. -253

C. -145

D. 253

Answer: C

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20. Show that

$$\left(1 + \cos.\frac{\pi}{8}\right)\left(1 + \cos.\frac{3\pi}{8}\right)\left(1 + \cos.\frac{5\pi}{8}\right)\left(1 + \cos.\frac{7\pi}{8}\right) = \frac{1}{8}$$

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

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

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

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

Answer: C

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21. If A and B are acute angles satisfying

$3\cos^2 A + 2\cos^2 B = 4 \quad \text{and} \quad \frac{3\sin A}{\sin B} = \frac{2\cos B}{\cos A}$,

then $A + 2B =$

A. 30°

B. 45°

C. 60°

D. 90°

Answer: D

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22. If A + B + C = $\frac{\pi}{3}$ then

$$\sin\left(\frac{\pi-6A}{6}\right)+\sin\left(\frac{\pi-6B}{6}\right)+\sin C=$$

A. A. $-1+4\cos\left(\frac{\pi-6A}{6}\right)+\cos\left(\frac{\pi-6B}{12}\right)+\frac{\sin C}{2}$

B. B. $4\sin\left(\frac{\pi+6A}{12}\right)\sin\left(\frac{\pi+6B}{12}\right)\frac{\cos C}{2}$

C. C. $1-4\cos\left(\frac{\pi-6A}{12}\right)\cos\left(\frac{\pi-6B}{12}\right)\frac{\cos(\pi-6C)}{12}$

D. D. $4\cos\left(\frac{\pi-6A}{12}\right)\cos\left(\frac{\pi-6B}{12}\right)\frac{\sin C}{2}$

Answer: D

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23. If $\sqrt{2}\sin^2 x+(3\sqrt{2}+1)\sin x+3>0$ and $x^2-7x+10<0$, then x lies in the interval

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

B. $\left(2,\frac{5\pi}{4}\right)$

C. $\left(0,\frac{3\pi}{2}\right)$

D. $\left(\frac{5\pi}{4}, 5\right)$

Answer: B

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24. If $\cos^{-1}x + \cos^{-1}y + \cos^{-1}z = 3\pi$, then

A. $x + y + z - 3 = 0$

B. $x + y + z + 3 = 0$

C. $x + 2y + 3z - 5 = 0$

D. $x - y - z = 0$

Answer: B

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25. If $\sin h^{-1}(\sqrt{8}) + \sin h^{-1}(\sqrt{24}) = \alpha$, then sin h $= \alpha$

A. $6\sqrt{6} - 10\sqrt{2}$

B. $6\sqrt{6} + 10\sqrt{2}$

C. $16\sqrt{6}$

D. $16\sqrt{6} + 4\sqrt{2}$

Answer: B

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26. In a triangle ABC . If

$\cos A \cos B + \sin A \sin B \sin C = 1$, then $\sin A + \sin B + \sin C =$

A. $\dfrac{2+\sqrt{3}}{2}$

B. $1 + \sqrt{2}$

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

D. $\dfrac{3+\sqrt{3}}{2}$

Answer: B

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27. In a ΔABC , if the medians AD and BE are such that AD = 4 , $\angle DAB = \frac{\pi}{6}$ and $\angle ABE = \frac{\pi}{3}$ then the area of ΔABC (in square units) is

A. $\frac{16}{3\sqrt{3}}$

B. $\frac{48}{3\sqrt{3}}$

C. $\frac{64}{3\sqrt{3}}$

D. $\frac{32}{3\sqrt{3}}$

Answer: D

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28. In a ΔABC, if $r_1 = 2r_2 = 3r_3$, then a : b = `

A. $3:5$

B. $5 : 3$

C. $4 : 5$

D. $5 : 4$

Answer: D

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29. If a and b are respectively the internal and external bisectors of the angles between the vetors $-\hat{i} + 2\hat{j} - 2\hat{k}$ and $3\hat{i} + 4\hat{j}$ and $|a| = \frac{2}{3}\sqrt{6}, |b| = \frac{2}{3}\sqrt{3}$, then one of the values of a - b is

A. $\frac{1}{10}\left(-8\hat{i} + 11\hat{j} - 2\hat{k}\right)$

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

C. $\frac{1}{15}\left(9\hat{i} - 11\hat{j} + 3\hat{k}\right)$

D. $\frac{1}{12}\left(2\hat{i} - 3\hat{j} - \hat{k}\right)$

Answer: B

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30. If the angle between the vectors

$2\alpha^2\hat{i} + 4\alpha\hat{j} + \hat{k}$ and $7\hat{i} - 2\hat{j} + \alpha\hat{k}$ is obtuse then

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

B. $0 < \alpha < \frac{1}{2}$

C. $\alpha < 0$

D. $|\alpha| < \frac{1}{2}$

Answer: B

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31. Let L be the line parallel to the vectors $\sqrt{2}\hat{i} - 5\hat{j} + 3\hat{k}$ and passing through the point a given by $\hat{i} + 2\hat{j} - 3\hat{k}$. If the distance between A and a point P on the line L is 18 units , then the position vector of such a point P is

A. $(1-3\sqrt{2})\hat{i}+17\hat{j}-12\hat{k}$

B. $(1+3\sqrt{2})\hat{i}+17\hat{j}+12\hat{k}$

C. $(1+3\sqrt{2})\hat{i}-17\hat{j}-12\hat{k}$

D. $(1-3\sqrt{2})\hat{i}-17\hat{j}+12\hat{k}$

Answer: A

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32. Let $a=p\left(\hat{i}+\hat{j}+\hat{k}\right).\ b=\hat{i}+\hat{j}-2\hat{k}$ and $c=2\hat{i}-\hat{j}+2\hat{k}$ be three vecotrs . If the values of [a b c] is not more than15 and not lees than -5, then the p lies in the interval

A. $\left(\frac{-5}{3},\frac{5}{9}\right)$

B. $\left(\frac{-15}{9},\frac{5}{9}\right)$

C. $\left(0,\frac{5}{9}\right)$

D. $\left(\frac{-5}{3}, \frac{5}{9}\right)$

Answer: D

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33. Let $a = \hat{i} + 2\hat{j} - \hat{k} \ \text{and} b = \hat{i} + \hat{j} + \hat{k}$. If p is a unit vecotr such that [abp] is maximum then p =

A. $\frac{1}{\sqrt{6}}\left(\hat{i} - 2\hat{j} + \hat{k}\right)$

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

C. $\frac{1}{\sqrt{14}}\left(3\hat{i} - 2\hat{j} - \hat{k}\right)$

D. $\frac{1}{\sqrt{14}}\left(\hat{i} + 2\hat{j} + 3\hat{k}\right)$

Answer: C

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34. If $a = 2\hat{i} - 3\hat{j} + \hat{k}, b = \hat{i} - \hat{j} + 2\hat{k}$ and $c = 2\hat{i} + \hat{j} + \hat{k}$ are three vecotrs , then $|(a \times b) \times c| =$

A. A. $|a \times (b \times c)|$

B. B. $\frac{\sqrt{39}}{\sqrt{11}}|a \times (b \times c)|$

C. C. $\sqrt{\frac{11}{39}}|a \times (b \times c)|$

D. D. $\sqrt{11}|a \times (b \times c)|$

Answer: C

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35. The mean deviation about the median of the following distributions is

x	6	12	18	24	30	36	42
f	4	7	9	18	15	10	5

A. 7.5

B. 8.4

C. 9.2

D. 9.6

Answer: A

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36. For a group of 100 observations, the arithmetic mean and standard deviation are 8 and $\sqrt{10.5}$ respectively. The mean and standard deviation of 50 items selected from these 100 observations are 10 and 2 respectively. Then the standard deviation of the remaining 50 observation is

A. 2

B. 3

C. 3.5

D. 4

Answer: B

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37. If a number is selected from the first 30 natural numbers, then the probability that the number selected is divisible by 4 or 7, is

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

B. $\frac{1}{5}$

C. $\frac{7}{30}$

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

Answer: D

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38. If 80% of flights depart on time, 70% of flights arrive on time and 65% of flights depart on time and arrive on time, then the probability that a flight that has just departed on time will arrive on time is

A. $\frac{13}{16}$

B. $\frac{11}{16}$

C. $\frac{13}{14}$

D. $\frac{11}{14}$

Answer: A

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39. A computer program has two modules X and Y and errors in them occur independently. X has an error with probability 0.1 and Y has an error with probability 0.3. If an error in X alone cause the program to crash with probability 0.5, an error in Y alone causes the program to crash with probability 0.7 and an error in both X and Y cause the program to crash with probability 0.8, then the probability that the program is crashed is

A. $\frac{23}{125}$

B. $\frac{26}{125}$

C. $\frac{29}{125}$

D. $\frac{31}{125}$

Answer: D

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40. Two dice are rolled. If a random variable X denotes the sum of the numbers on them and μ denotes the mean of X, then

$\mu + P(X < 5) + P(X > 9) + P(x = 7) =$

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

B. 17

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

D. 15

Answer: A

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41. A boy rolled a die once. If an even number appear on then the number of chocolates the boy gets is equal to two more then the number appeared. If an odd number appear on that die. Then the number of chocolates he gets is equal to three more than the number'appeared. If a random variable X represents the number of chocolates the boy receive, then the range of X is

A. {4,6,8}

B. {3,5,7}

C. {3,4,7}

D. {2, 3}

Answer: A

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42. Match the locus of the points in List-I with the curves in List-II (Here, p.4 and r are constants and t, θ and λ are parameters)

	List I		List II
(A)	$\left[\frac{p}{2}\left(t+\frac{1}{t}\right), \frac{q}{2}\left(t-\frac{1}{t}\right)\right]$	(I)	parabola
(B)	$(p + q\cos\theta, r + q\sin\theta)$	(II)	circle
(C)	$(p + \lambda^2, q - \lambda)$	(III)	ellipse
		(IV)	hyperbola

The correct match is

A. $A \rightarrow (IV), B \rightarrow (I), C \rightarrow (II)$

B. $A \rightarrow (III), B \rightarrow (II), C \rightarrow (I)$

C. $A \rightarrow (IV), B \rightarrow (II), C \rightarrow (I)$

D. $A \rightarrow (II), B \rightarrow (III), c \rightarrow (IV)$

Answer: C

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43. When the origin is shifted to (1, -2) by translation of coordinate axes, the transformed coordinates of (3.-2) are (α, β) If the axes are rotated about origin through an angle of 45° after the translation, then the transformed coordinates of (α, β) are

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

B. $(0, \sqrt{2})$

C. $(-\sqrt{2}, \sqrt{2})$

D. $(\sqrt{2}, -\sqrt{2})$

Answer: D

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44. If a straight line is passing through the point of intersection of the lines 3x - 4y + 1 = 0, 5x + y - 1 = 0 and making equal non-zero intercepts on the coordinate axes, then the area (in sq. units) of the triangle formed by this line with the coordinate axes, is

A. $\frac{121}{1058}$

B. $\frac{121}{529}$

C. $\frac{529}{121}$

D. $\frac{1059}{121}$

Answer: A

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45. If the equations of the perpendicular bisectors of the sides AB and AC of a Δ ABC are x - y + 5 = 0 and x + 2y =0 respectively and if A is (1,-2), then the equation of the perpendicular bisector of the side BC is

A. 3x + 3y + 5 = 0

B. 9x - 23y + 40 =0

C. 6x + 15y = 5

D. 23x - 14y + 100 = 0

Answer: D

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46. If the lines x + 3y - 5 = 0 , 5x +2y-12 = 0 and 3x -ky-1=0 do not form a triangle, then a value of k is

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

B. $\frac{-1}{5}$

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

D.

Answer: C

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47. If the combined equation of the diagonals of the square formed by the pairs of lines xy + 4x - 5y - 20 = 0 and xy - 5x + 4y - 20 =0 is

$x^2 - y^2 - kx + ly = 0$, then k+l =

A. 0

B. 2

C. -1

D. 1

Answer: B

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48. The equation of the pair of bisectors of the angle between the pair of straight lines $3x^2 + 7xy + 2y^2 + 5x + 5y + 2 = 0$ is

A. $7(3x+5)^2 - 2(3x+5)(y+5) - 7(y+5)^2 = 0$

B. $7(3x-5)^2 - 2(3x-5)(y-5) - 7(y-5)^2 = 0$

C. $7(5x+3)^2 - 2(5x+3)(5y+1) - 7(5y+1)^2 = 0$

D. $7(5x-3)^2 - 2(5x-3)(5y-1) - 7(5y-1)^2 = 0$

Answer: C

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49. If $x = \frac{2at}{1+t^2}, y = \frac{a(1-t^2)}{1+t^2}$, where t is a parameter, then a is

A. the length of the latusrectum of a parabola

B. the radius of a circle

C. the length of the transverse is of a hyperbola

D. the length of the semi-major is of an elipse

Answer: B

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50. Consider the following statement :

I. $P(x_1, y_1)$ and $Q(x_2, y_2)$ are conjugate points with respect to the circle $x^2 + y^2 + 2gx + 2fy + c = 0$ then

$x_1x_2 + y_1y_2 + g(x_1 + x_2) + f(y_1 + y_2) + c = 0$

II. The pole of the line x + y + 1 =0 with respect to the circle $x^2 + y^2 = 9$ is (9.9).

Then, which one of the following is true?

A. Both I and II are true

B. Neither I nor II is true

C. I is false and II is true

D. I is true and II is false

Answer: D

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51. If p is the point of contact of the circles

$x^2 + y^2 + 4x + 4y - 10 = 0$ and

$x^2 + y^2 - 6x - 6y + 10$ = 0 ` and Q is their external centre of similitude, then the equation of the circle with P and Q as the extremities of its diameter is

A. $x^2 + y^2 + 14x + 14y - 26 = 0$

B. $x^2 + y^2 + 5x + 5y - 8 = 0$

C. $x^2 + y^2 - 5x - 5y + 8 = 0$

D. $x^2 + y^2 - 14x - 14y + 26 = 0$

Answer: D

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52. let

$k > 0, s_\alpha \equiv x^2 + y^2 + 2\alpha x + k = 0 \text{ and } s_\beta \equiv x^2 + y^2 + 2\beta y - k = 0$

. Then match the items of List -I with those of List - II

	List I		List II
(A)	Point circles of $s_\alpha = 0$	(i)	do not exist
(B)	Point circles of $s_\beta = 0$	(ii)	intersecting
(C)	The circles in $s_\alpha = 0$ are	(iii)	non-intersecting
(D)	The circles in $s_\beta = 0$ are	(iv)	$(\pm\sqrt{k}, 0)$
		(v)	$(0, \pm\sqrt{k})$

The correct match is

A. $A \to (iii), B \to (iv), C \to (ii), D \to (i)$

B. $A \to (ii), B \to (iv), C \to (i), D \to (iii)$

C. $A \to (iv), B \to (i), C \to (iii), D \to (ii)$

D. $A \to (iv), B \to (iii), C \to (i), D \to (ii)$

Answer: C

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53. The equation of the circle touching the line 2x + 3y + 1 = 0 at the point (1,-1) and orthogonal to the circle which has the line segment having end points (0, -1) and (-2,3) as diameter, is

A. $x^2 + y^2 - 10x + 5y + 1 = 0$

B. $x^2 + y^2 + 5x - 10y - 1 = 0$

C. $2x^2 + 2y^2 + 10x - 5y - 1 = 0$

D. $2x^2 + 2y^2 - 10x - 5y + 1 = 0$

Answer: D

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54. The angle between the tangents drawn from the point (1,4) to the parabola $y^2 = 4x$ is

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

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

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

D. π

Answer: A

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55. If the line $y = -x + k$ is normal to the curve $y^2 = 16x$, then k is

A. 21

B. 14

C. 13

D. 12

Answer: D

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56. The normal drawn at the point

$\left(\sqrt{9}\cos\left(\frac{\pi}{4}\right), \sqrt{7}\sin\left(\frac{\pi}{4}\right)\right)$ to the ellipse $\frac{x^2}{9} + \frac{y^2}{7} = 1$

intersects its major axis at the point

A. $\left(0, \sqrt{\frac{2}{7}}\right)$

B. $\left(-\sqrt{\frac{2}{9}}, 0\right)$

C. $\left(0, -\sqrt{\frac{2}{7}}\right)$

D. $\left(\sqrt{\frac{2}{9}}, 0\right)$

Answer: D

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57. If (1, - 2) is the focus and x + y - 2 = 0 is the directrix of the ellipse $17x^2 - 2xy + 17x^2 - 32x + 76x + 86 - 0$, then its eccentricity is

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

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

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

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

Answer: C

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58. The line 2x + y =1 is a tangent to the hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1(a > b)$. If this line passes through the point of intersection of a directrix and the positive X-axis, then the eccentricity of that hyperbola is

A. A. $\sqrt{2}$

B. B. 2

C. C. $\sqrt{3}$

D. D. 3

Answer: B

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59. If the orthocentre and the centroid of a triangle are at (5, 2, -6) and (9, 6, -4) respectively, then its circumcentre is

A. $(11, 8, -3)$

B. $(8, 8, -3)$

C. $(11, 8, 3)$

D. $(11, -8, -3)$

Answer: A

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60. If the direction ratios of two lines are given by a + 2b + c = 0 and 11 bc +6ca - 14 ab = 0 . then the angle between these lines is

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

B. $\cos^{-1}\left(\frac{1}{3}\right)$

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

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

Answer: D

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61. A plane cuts the coordinate axes X,Y,Z at A,B,C respectively such that the centroid of the ΔABC is (6,6,3). Then the equation of that plane is

A. x + y + z = 18

B. x + 2y + z = 18

C. x + y + 2z = 18

D. 2x + y + 2=18

Answer: C

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62. $\lim_{x \to \infty} x\left(\log\left(1+\frac{x}{2}\right)-\log\frac{x}{2}\right)=$

A. 0

B. 1

C. 2

D. e

Answer: C

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63. The set of values of x for which the function $f(x) = \log\left(\frac{x-1}{x+2}\right)$ is continous , is

A. R

B. $(-\infty, -2) \cup (0, \infty)$

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

D. $(-2, -1)$

Answer: C

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64. If the function $f: R \rightarrow R,$ defined by

$$f(x) = \begin{cases} 5 - 3x \quad, \text{if} x \leq \frac{5}{3} \\ \\ x^2 - 3x + 20, \text{ if } \ x > \frac{5}{3} \end{cases} \quad \text{, then 'f' is}$$

A. continous at $x = \dfrac{5}{3}$

B. differentiable at x $= \dfrac{5}{3}$

C. differentiable at x = 2

D. dicontinous at x = - 2

Answer: C

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65. If t is a parameter and $x = t + \dfrac{1}{t}, y = t - \dfrac{1}{t}, \quad \text{then} \quad \dfrac{d^2y}{dx^2} =$

A. $\dfrac{4t}{\left(t^2 - 1\right)^2}$

B. $\dfrac{t^2}{\left(t^2 - 1\right)}$

C. $\dfrac{4t^3}{\left(t^2 - 1\right)^3}$

D. $\dfrac{-4t^3}{(t^2-1)^3}$

Answer: D

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66. If $ax^2+2hxy-by^2=3$ then $\dfrac{d^2y}{dx^2}$ =

A. $\dfrac{\left(hx^2+by+ax\right)}{(ax+hy)^2}$

B. $\dfrac{\left(axy+hx^2+byx\right)}{(ax+by)^2}$

C. $\dfrac{3\left(h^2-ab\right)}{(hx+by)^3}$

D. $\dfrac{(ab+h)^2}{(ax+hy)^2}\left[h\left(x+y^2\right)+xy(a+b)\right]$

Answer: C

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67. If the error in measuring the side l of an equilateral triangle is 0.01, then the percentage error in the area of the triangle, in terms of its side l is

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

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

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

D. $\frac{6}{l}$

Answer: A

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68. If at any point (x_1, y_1) on the curve y=f(x) the lengths of the subtangent and subnormal are equal, then the length of the tangent drawn to that curve at that point is

A. $2|y_1|$

B. $\sqrt{2}|y_1|$

C. $\sqrt{5}|y_1|$

D. $\sqrt{2}\left|\frac{y_1}{x_1}\right|$

Answer: B

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69. The height of a right circular cylinder is decreasing while is diameter is increasing at a rate of 4 cm/see so as to keep its volume unchanged, the rate of change in its lateral surface area (in cm^2 /sec) at the instant when its diameter is 8 cm and height is 12 cm, is

A. 24π

B. -24π

C. 48π

D. -48π

Answer: C

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70. If x + y = 60 , x > 0 , y > 0 , then the maximum value of xy^3 is

A. $(15)^4 \frac{25}{3}$

B. $45(15)^2$

C. $\left((45)^2\right)\frac{9}{5}$

D. $\frac{(45)^4}{3}$

Answer: D

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71. $\int \sqrt{1 + 2\cot x(\cot x + \cos ecx)}dx$ =

A. $2\log\left|\sin\left[\frac{x}{2}\right]\right| + c$

B. $2\log\left|\frac{\cos x}{2}\right|+c$

C. $\log\left|\frac{\sin x}{2}+\frac{\cos x}{2}\right|+c$

D. $2 \quad \log \quad |\sin x+\cos x|+c$

Answer: A

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72. If $\int e^{\alpha x}\left(\frac{1-\beta\sin x}{1-\cos x}\right)dx = -e^{x}\frac{\cot x}{2}+c,$ then $\frac{\alpha^2+\beta^2}{2\alpha\beta}$ =

A. A. -1

B. B. 1

C. C. 2

D. D. -2

Answer: B

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73. $\int \frac{2x^2 - 4x^2 - x - 3}{x^2 - 2x - 3} dx =$

A. $\frac{7}{2} \quad \log \quad |x - 1| + \frac{3}{2}\log|x + 3| + c$

B. $2\log|x - 1| + \frac{7}{2}\log|x + 3| + c$

C. $2x + \frac{1}{2}\log|x + 1| + \frac{3}{4}\log|x - 3| + c$

D. $x^2 + 2\log|x + 1| + 3\log|x - 3| + c$

Answer: D

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74. $\int \cos ec^5 x dx =$

A. $\frac{\cos ecx \cot^3 x}{4} - \frac{5}{8}\cos ecx \cot x + \frac{3}{8}\log\left|\frac{\tan x}{2}\right| + c$

B. $-\frac{\cos ecx \cot^3 x}{4} - \frac{5}{8}\cos ecx \cot x + \frac{3}{8}\log\left|\frac{\tan x}{2}\right| + c$

C. $-\frac{\cos e \hat{\ } 3x \cot x}{4} - \frac{3}{8}\cos ecx \cot x + \frac{3}{8}\log\left|\frac{\tan x}{2}\right| + c$

D. $-\frac{\cos ec^3 x \cot x}{4}+\frac{3}{8}\cos ecx \cot x-\frac{3}{8}\log\left|\frac{\tan x}{2}\right|+c$

Answer: C

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75. $\int_{\frac{1}{3}}^{3}\frac{1}{x}\sin\left(\frac{1}{x}-x\right)dx=$

A. 0

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

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

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

Answer: A

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76. $\int_{-1}^{\frac{3}{2}}|x\sin(\pi x)|dx=$

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

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

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

D. $\frac{3}{\pi} + \frac{1}{\pi^2}$

Answer: D

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77. Area of the region (in square units) bounded by the curve y = $x^2 + 4$ and the line y = 5x - 2 is

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

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

C. 2

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

Answer: D

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78. If m and n are the order and degree of the differential equation of the family of parabolas with focus at the origin and X-axis as its axis, then mn - m + n =

A. 1

B. 2

C. 3

D. 4

Answer: C

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79. The solution of defferential equation

$$\frac{dy}{dx}+\frac{x}{y}.\frac{x^2+y^2-1}{2(x^2+y^2)+1}=0 \text{ is}$$

A. $x^2 + y^2 + 3\log(x^2 + y^2) = c$

B. $x^2 + 3xy - 3\log(x^2 + y^2 + 2) = c$

C. $x^2 + 2y^2 - 3\log(x^2 + y^2 + 2) = c$

D. $-x^2 - 2y^2 - 3\log(x^2 + y^2) = c$

Answer: C

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80. If $x \quad \log \quad x\dfrac{dy}{dx} + y = \log x^2 \quad \text{and} \quad y(e) = 0$, then $y(e^2) =$

A. 0

B. 1

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

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

Answer: D

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