MATHS

BOOKS - TS EAMCET PREVIOUS YEAR PAPERS

TS EAMCET ENGINEERING ENTRANCE EXAM QUESTION PAPER (2018)

Mathematics

1. Let X $=\left\{\begin{pmatrix} a & b \\ c & d \end{pmatrix}: a, b, c, d \in R\right\}$ Define $f: X \to R$ by f(A) = det (A) , $\forall A \in x$. then , f is

A. one - one but not onto

B. onto but not one - one

C. one- one and onto

D. neither one - one nor onto

Answer: B

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2. Let $x \neq 0, |x| < \frac{1}{2}$ and $f(x) = 1 + 2x + 4x^2 + 8x^3 + \ldots\ldots$ then , $f^{-1}(x) =$

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

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

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

D. $1 - 2x$

Answer: A

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3. For all positive integers k, if the greatest divisor of $25^k + 12k - 1$ is d , then $4\sqrt{d}$ =

A. 36

B. 8

C. 20

D. 24

Answer: D

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4. If A = $\begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix}$,

then (AA')' =

A. $\begin{bmatrix} 14 & 32 & 50 \\ 32 & 122 & 194 \\ 50 & 194 & 256 \end{bmatrix}$

B. $\begin{bmatrix} 14 & 50 & 32 \\ 32 & 122 & 194 \\ 50 & 194 & 122 \end{bmatrix}$

C. $\begin{bmatrix} 14 & 32 & 50 \\ 32 & 194 & 122 \\ 32 & 122 & 77 \end{bmatrix}$

D. $\begin{bmatrix} 14 & 32 & 50 \\ 32 & 77 & 122 \\ 50 & 122 & 194 \end{bmatrix}$

Answer: D

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5. If $\begin{vmatrix} 1 & a^2 & a^3 \\ 1 & b^2 & b^3 \\ 1 & c^2 & c^3 \end{vmatrix}$ and $\Delta_2 = \begin{vmatrix} bc & b+c & 1 \\ ca & c+a & 1 \\ ab & a+b & 1 \end{vmatrix}$, then

$\frac{\Delta_1}{\Delta_2} =$

A. ab + bc + ca

B. abc

C. 2(ab + bc+ ca)

D. $(a + b + c)^2$

Answer: A

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6. If x = a , y = b, z = c is the solution of the system of simultaneous linear equations x + y + z = 4, x- y + z =2, x + 2y + 2z =1, then ab + bc + ca =

A. 0

B. -25

C. 1

D. -4

Answer: B

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7. The common roots of the equations

$z^3+2z^2+2z+1=0$ and $z^{2018}+z^{2017}+1=0$

satisfy the equation

A. $z^2-z+1=0$

B. $z^4+z^2+1=0$

C. $z^6 + z^3 + 1 = 0$

D. $z^{12} + z^5 - 1 = 0$

Answer: B

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8. The area (in sq units) of the triangle whose vertices are the points represented by the complex numbers 0, z , $ze^{i\alpha}(0 < \alpha < \pi)$ is

A. $\frac{1}{2}|z|^2$

B. $\frac{1}{2}|z|^2 \sin\alpha$

C. $\frac{1}{2}|z|^2 \sin\alpha\cos\alpha$

D. $\frac{1}{2}|z|^2 \cos \alpha$

Answer: B

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9. If $z + \frac{1}{z} = 1,$ then $\frac{(z^{20}+1)(z^{40}+1)(z^{60}+1)}{z^{60}}$ =

A. -2

B. 2

C. 1

D. -1

Answer: B

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10. If $\omega_0, \omega_1, \ldots\ldots\ldots, \omega_{n-1}$ are the nth roots of unity then

$(1+2\omega_0)(1+2\omega_1)(1+2\omega_2)\ldots..(1+2\omega_{n-1}) =$

A. $1+(-1)^n 2^n$

B. $1+2^n$

C. $(-1)^n+2^n$

D. $1+(-1)^{n-1}2^n$

Answer: D

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11. If $k \in R$, then roots of $(x-2)(x-3)=k^2$ are always `

A. real and distinct

B. real and equal

C. comlex number

D. rational numbers

Answer: A

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12. If $x^2 - 3ax + 14 = 0$ and $x^2 + 2ax - 16 = 0$ have a common root than $a^4 + a^2$ =

A. 2

B. 90

C. 6

D. 20

Answer: B

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13. If $\alpha_1, \alpha_2, \ldots\ldots\ldots, \alpha_n$ are the roots of $x^n + px + q = 0$, then $(\alpha_n - \alpha_1)(\alpha_n - \alpha_2)\ldots\ldots\ldots(\alpha_n - \alpha_{n-1}) =$

A. $n\alpha_n^{n-1} + q$

B. $\alpha_1^2 + \alpha_2^3 + \ldots\ldots + \alpha_{n-1}^2$

C. $\alpha_n^{n-1} + p$

D. $n\alpha_n^{n-1} + p$

Answer: D

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14. All the roots of the equation

. $x^5 + 15x^4 + 94x^3 + 305x^2 + 507x + 353 = 0$ are increased by some real number k in order to eliminate the 4th degree term from the equation. Now, the coefficient of x in the transformed equation is

A. 2

B. 1

C. 6

D. 0

Answer: D

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15. The number of ways in which four letters can be put in four addressed envelops so that no letter goes into envelope meant for it is

A. 8

B. 12

C. 16

D. 9

Answer: D

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16. If the integer represented by 100! has K consective zeroes at the end, then K =

A. 24

B. 36

C. 64

D. 128

Answer: A

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17. If n is a positive integer and the coefficient of x^{10} in the expansion of $(1+x)^{15}$ is equal to the coefficient of x^5 in the expansion of $(1-x)^{-n}$ then n =

A. 15

B. 12

C. 11

D. 10

Answer: C

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18. If

$$x = \frac{2.5}{3.6} - \frac{2.5.8}{3.6.9}\left(\frac{2}{5}\right) + \frac{2.5.8.11}{3.6.12}\left(\frac{2}{5}\right)^2 - \ldots\ldots\infty ,$$

then $7^2(12x + 55)^3 =$

A. $3^8 5^3$

B. $3^8 5^5$

C. $3^3 5^5$

D. $3^2 5^8$

Answer: D

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19. If F_1 and F_2 are irreducible factors of $x^4 + x^2 + 1$ with real coefficients and $\frac{x^3 - 2x^2 + 3x - 4}{x^4 + x^2 + 1} = \frac{Ax + B}{F_1} + \frac{Cx + D}{F_2}$, then A + B + C + D =

A. -2

B. 1

C. -3

D. -4

Answer: C

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20. The number of all the possible integral values of $n > 2$ such that $\frac{\sin(\pi)}{2n} + \frac{\cos(\pi)}{2n} = \frac{\sqrt{n}}{2}$ is

A. 3

B. 4

C. 3

D. infinity

Answer: C

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21. If α and β are angles in the first quadrant sucn than $\tan \alpha = \frac{1}{7}$ and $\sin \beta = \frac{1}{\sqrt{10}}$, then $\alpha + 2\beta =$

A. 30°

B. 45°

C. 75°

D. 90°

Answer: B

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22. $\cos\left(\frac{\pi}{7}\right)\cos\left(\frac{2\pi}{7}\right)\cos\left(\frac{4\pi}{7}\right) =$

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

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

C. $-\frac{3\sqrt{3}}{8}$

D. 1

Answer: A

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23. If $0 < \theta < \frac{\pi}{2}$, the solution of the equation $\sin\theta - 3\sin 2\theta + \sin 3\theta = \cos\theta - 3\cos 2\theta + \cos 3\theta$ is

A. $(\pi)(16)$

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

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

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

Answer: C

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24. $\sin^{-1}\left(\frac{12}{13}\right)+\cos^{-1}\left(\frac{4}{5}\right)+\tan^{-1}\left(\frac{63}{16}\right)=$

A. 2π

B. π

C. 0

D. $-\pi$

Answer: C

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25. If $\sin hx=\frac{3}{4}$ and $\cos hy=\frac{5}{3}$, then x + y =

A. log 2

B. log 6

C. log 3

D. log 5

Answer: C

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26. In a ΔABC , if a = 5 , b = 6, c = 7` , then the length of the median drawn from B is

A. $2\sqrt{7}$

B. $2\sqrt{6}$

C. $\sqrt{7}$

D. $\sqrt{6}$

Answer: B

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27. If ΔABC , if $\frac{\cot A}{2}, \frac{\cot B}{2} : \frac{\cot C}{2} = 4 : 3 : 2$, then a : b : c =

A. $2 : 3 : 4$

B. $6 : 5 : 7$

C. $4 : 5 : 6$

D. $5 : 6 : 7$

Answer: D

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28. If ΔABC if cos A cos B + sin A sin B sin C = 1 and $C = \frac{\pi}{2}$, then A : B =

A. $1:2$

B. $1:3$

C. $1:2$

D. $1:1$

Answer: D

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29. If a, b, c are distinct real numbers and P, Q, R are three points whose position vectors are respectively $a\hat{i} + b\hat{j} + c\hat{k}, b\hat{i} + c\widehat{J} + a\hat{k}$ and $chai + a\hat{j} + b\hat{k}$, then $\angle QPR$ =

A. $\cos^{-1}(a + b + c)$

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

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

D. $\cos^{-1}\left(\frac{a^2 + b^2 + c^2}{abc}\right)$

Answer: C

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30. $Leta = \sin^2 x\hat{i} + \cos^2 x\hat{j} + \hat{k}, (x \in R)$. If the pairs of vectors a , $\hat{i}, a, \hat{j}$ and a , $\hat{k}$ are adjacent sides of 3 distinct parallelograms and A is the sum of the squares of areas these parallelograms ,then A lies in the interval

A. $(0, 1)$

B. $(3, 4)$

C. $(0, 2)$

D. $(1, 2)$

Answer: B

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31. Assertion (A) a, b, c, d are position vectors of 4 points such that 2a - 3b + 7c -6d = 0 $\Rightarrow$ a, b, c, d are coplanar.

Reason (R) Vector equation of the plane passing through three points whose position vectors are a, b, c is r = (1-x-y) a + x + yc. Which of the following is true?

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

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

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

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

Answer: A

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32. If |a| = 4, |b| = 5, |a - b| = 3 and θ is the angle between the vectors a and b , then $\tan^2\theta$ =

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

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

C. $\frac{16}{9}$

D. $\frac{9}{16}$

Answer: D

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33. If e is unity vector perpendicular to the plane determined by the points $2\hat{i}+\hat{j}+\hat{k}, \hat{i}-\hat{j}+\hat{k}-\hat{j}+\hat{k}$ and $-\hat{i}+\hat{j}-\hat{k}$. If $a=2\hat{i}-3\hat{j}+6\hat{k}$, then the projection vector of a on e is

A. $\frac{11}{14}\left(-2\hat{i}+\hat{j}+3\hat{k}\right)$

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

C. $\frac{1}{7}\left(2\hat{i}-3\hat{j}+6\hat{k}\right)$

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

Answer: A

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34. If $a = 2\hat{i} + j - 3\hat{k}, b = \hat{i} - 2\hat{j} + 3\hat{k}$, $c = -\hat{i} + \hat{j} - 4\hat{k}$ and $d = \hat{i} + \hat{j} + 2\hat{k},$ then $(a \times b) \times (c \times d)$ =

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

B. $8\hat{i} - 36\hat{j} + 60\hat{k}$

C. $5\hat{i} + \hat{j} - \hat{k}$

D. $-8\hat{i} - 36\hat{j} + 12\hat{k}$

Answer: B

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35. The mean and standard deviation of a distribution of weights of a group of 20 boys are 40 kg and 5 kg respectively. If two boys of weights 43 kg and 37 kg are excluded from this group, then the variance of the distribution of weights of the remaining group of boys is

A. 26.18

B. 5.27

C. 26.78

D. 5.17

Answer: C

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36. Consider the following data

	Group I	Group II	Group III
Number of observations	50	60	90
Mean	113	120	115
Standard deviation	6	8	7

with respect to the consistencies of the above groups , the increasing order of them is

A. I, III , II

B. II , III , I

C. III, II , I

D. I , II , III

Answer:

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37. In a battery manufacturing factory, machines P, Q and R manufacture 20%, 30% and 50% respectively of the total output. The chances that a defective battery is produced by these machines are 1%, 1.5% and 2% respectively. If a battery is selected as random from production, then the probability that it is defective is

A. $\frac{69}{2000}$

B. $\frac{33}{2000}$

C. $\frac{1}{40}$

D. $\frac{29}{2000}$

Answer: B

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38. Suppose A and B are events of a random experiment such that $P(A)=\frac{1}{3}, P(A\cap B)=\frac{1}{5}$ and $P(A\cup B)=\frac{3}{5}$. Then, match the items of List-I with the items of List-II

	List-I		List-II
A	$P\left(\frac{A}{B}\right)$	(i)	$\frac{2}{15}$
B	$P(\bar{B})$	(ii)	$\frac{4}{15}$
C	$P(A\cap\bar{B})$	(iii)	$\frac{8}{15}$
D	$P(B\cap\bar{A})$	(iv)	$\frac{2}{3}$
		(v)	$\frac{3}{7}$

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

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

C. $A \rightarrow (iv), B \rightarrow (ii), C \rightarrow (i), D \rightarrow (v)$

D. $A \rightarrow (v), B \rightarrow (iii), C \rightarrow (i), D \rightarrow (ii)$

Answer: D

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39. In a test, a student either guesses or copies or knows the answer to a multiple choice question with four choices having one correct answer. The probability that he guesses the answer is $\frac{1}{3}$ and the probability that he copies it is $\frac{1}{12}$. the probability that his answer is correct given that he copied it is $\frac{1}{6}$ the probability that he knew the answer, given that he has correctly answered it, is

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

B. $\frac{15}{49}$

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

D. $\frac{10}{13}$

Answer: A

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40. The probability that a mechanic making an error while using a machine on the nth day is given by $P(E_n) = \frac{1}{2^n}$ If he has operated the machine for 4 days, the probability that he had not made a mistake on 3 of 4 days is

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

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

C. $\frac{243}{512}$

D. $\frac{343}{1024}$

Answer: C

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41. If the probability of a bad reaction from a vaccination is 0.01, then the probability that exactly two out of 300 people will get bad reaction is

A. $\frac{7}{2e^3}$

B. $\frac{9}{2e^3}$

C. $\frac{7}{e^3}$

D. $\frac{9}{e^3}$

Answer: B

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42. A(2, 1) and B(1, 2) are two points. If P is a point such that $PA : PB = 2 : 1$, then the locus of P is

A. $8x^2 + 2xy + 8y^2 + 27x + 27y + 45 = 0$

B. $4x^2 + xy + 4y^2 - 27x - 27y + 90 = 0$

C. $32x^2 + 8xy + 32y^2 - 108x - 108y + 99 = 0$

D. $8x^2 - 2xy + 8y^2 - 27x - 27y + 45 = 0$

Answer: C

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43. For $a \ne b \ne c$ if the lines x + 2ay + a = 0 , x + 3by + b = 0 and x + 4cy + c = 0 ar concurrent , then a , b, c are in

A. Arithmetic progression

B. Geometric progression

C. Harmonic progression

D. Arithmetico geometric progression

Answer: C

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44. A point moves in the XY-plane such that the sum of its distances from two mutually perpendicular lines is always equal to 3. The area enclosed by the locus of that point is (in sq, units)

A. 27

B. 18

C. 9

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

Answer: B

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45. The equation of two altitudes of an equilateral triangle are $\sqrt{3}x - y + 8 - 4\sqrt{3} = 0$ and $\sqrt{3}x + y - 12 - 4\sqrt{3} = 0$. The equation of the third altitude is

A. $\sqrt{3}x + y = 4$

B. $y = 10$

C. $x = 10$

D. $x - \sqrt{3}y = 4$

Answer: B

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46. If $P_1, P_2, P_3, \ldots\ldots\ldots, P_n$ are n points on the line y = x all lying in the first quadrant, such that $(OP_n) = n(OP_{n-1})$ (O is origin), $OP_1 =$ and $P_n = \left(2520\sqrt{2}, 2520\sqrt{2}\right)$, then n =

A. 5

B. 6

C. 7

D. 8

Answer: C

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47. The straight line $x + y + 1 = 0$ bisects an angle between the pair of lines of which one is $2x - 3y + 4 = 0$. Then, the equation of the other line is

A. $3x - 2y + 5 = 0$

B. $3x - 2y - 9 = 0$

C. $3x + 2y + 9 = 0$

D. $x - y - 1 = 0$

Answer: C

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48. The combined equation of the pair of straight lines passing through the point of intersection of the pair of lines

$x^2 + 4xy + 3y^2 - 4x - 10y + 3 = 0$ and having slopes $\frac{1}{2}$ and $-\frac{1}{3}$ is

A. $x^2 - y^2 - 8x - 2y + 15 = 0$

B. $x^2 + 7xy + 12y^2 - x - 4y = 0$

C. $x^2 + 7xy + 10y^2 - x - 8y - 2 = 0$

D. $x^2 + xy - 6y^2 - 7x - 16y + 6 = 0$

Answer: D

49. If a circle $C_1, x^2 + y^2 = 16$ intersects another circle C_2 of radius 5 in such a manner that the common chord is maximum length and has slope $\frac{3}{4}$, then show the centres of C_2 are $\left(\frac{9}{5}, \frac{-12}{5}\right), \left(\frac{-9}{5}, \frac{12}{5}\right)$

A. $\left(-\frac{9}{5}, \frac{12}{5}\right)$

B. $\left(\frac{9}{5}, \frac{12}{5}\right)$

C. $\left(-\frac{5}{9}, \frac{6}{5}\right)$

D. $\left(\frac{7}{5}, -\frac{12}{5}\right)$

Answer: A

50. The equation of the circle which touches the circle $x^2 + y^2 - 6x + 6y + 17 = 0$ externally and having the lines $x^2 - 3xy - 3x + 9y = 0$ as two normals ,is

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

B. $x^2 + y^2 + 2x + 3y + 1 = 0$

C. $x^2 + y^2 - 6x - 2y + 1 = 0$

D. $x^2 + y^2 + 4x - 3y + 3 = 0$

Answer: C

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51. Let A be the centre of the circle $x^2 + y^2 - 2x - 4y - 20 = 0$. Suppose that the tangent at the points B(1,7) and D(4,-2) on the circle meet at the point C. The area of the quadrilateral ABCD is

A. 60

B. 65

C. 70

D. 75

Answer: D

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52. Let x - 4 = 0 be the radical axis of two circles which are intersecting orthogonally . If $x^2 + y^2 = 36$ is one of those circles , then the other circle is

A. $x^2 + y^2 - 16x + 36 = 0$

B. $x^2 + y^2 - 18 + 36 = 0$

C. $x^2 + y^2 - 18x + 24 = 0$

D. $x^2 + y^2 - 6x + 8y + 36 = 0$

Answer: B

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53. The length of common chord of the circles

$x^2 + y^2 - 6x - 4y + 13 - c^2 = 0$ and

$x^2 + y^2 - 4x - 6y + 13 - c^2 = 0$ is

A. $\sqrt{4c^2 - 2}$

B. $\frac{1}{2}\sqrt{4c^2 - 2}$

C. $\sqrt{c^2 - 2}$

D. $\sqrt{c^2 - 1}$

Answer: A

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54. If P is (3, 1) and Q is a point on the curve $y^2 = 8x$, then the locus of the mid-point of the line segment PQ is

A. $4y^2 - 12x - 6y + 21 = 0$

B. $4y^2 - 16x - 4y + 25 = 0$

C. $4y^2 + 8x - 3y - 18 = 0$

D. $4y^2 - 12x + 8y - 15 = 0$

Answer: B

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55. Let P(2,4), Q(18, -12) be the points on the parabola $y^2 = 8x$. The equation of straight line having slope $\frac{1}{2}$

and passing through the point of intersection of the tangents to the parabola drawn at the points P and Q is

A. 2x - y = 1

B. 2x - y = 2

C. x - 2y = 1

D. x - 2y = 2

Answer: D

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56. Let A be a vertex of the ellipse $S = \frac{x^2}{4} + \frac{y^2}{9} - 1 = 0$ and F be focus of the ellipse

$S' = \frac{x^2}{9} + \frac{y^2}{4} - 1 = 0$ .Let P be a point on the major axis of the ellipse S' = 0 , which divides $\overline{OF}$ in the ratio 2 : 1 (O is the origin). If the length of the chord of the ellipse S = 0 through A and P is $\frac{3\sqrt{101}}{k}$, then k =

A. 5

B. 4

C. 7

D. 8

Answer: C

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57. Tangents are drawn to the ellipse $\frac{x^2}{25} + \frac{y^2}{16} = 1$ at all the four ends of its latusrectum. Then, the area (in sq units) of the quadrilateral formed by these tangents is

A. $\frac{125}{6}$

B. $\frac{250}{3}$

C. $\frac{80}{3}$

D. $\frac{260}{3}$

Answer: B

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58. The lines of the form $x \cos \phi + y \sin \phi = P$ are chords of the hyperbola $4x^2 - y^2 = 4a^2$ which subtend a right angle at the centre of the hyperbola. If these chords touch a circle with centre at (0, 0), then the radius of that circle is

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

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

C. $\sqrt{2}a$

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

Answer: A

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59. Let A(3, 2, - 4) and B(9, 8, -10) be two points. LetP_1 divide AB in the ratio 1: 2 and P_2 divide AB in the ratio 2 : 1. If the point $P(\alpha, \beta, \gamma)$ divides P_1P_2 in the ratio 1:1, then$\alpha + 2\beta + 2\gamma$ =

A. 1

B. 2

C. 3

D. 4

Answer: B

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60. If the direction cosines of the two lines satisfy the equations l + m + n = 0,2lm + 2ln - nm = 0, then the acute angle between these lines is

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

B. 80°

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

D. 60°

Answer: D

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61. If the equation of the plane passing through the point (2,-1, 3) and perpendicular to the planes 3x - 2y + z = 9 and x + y + z = 9 is x + by + cz + d = 0, then d =

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

B. B 0

C. C 3

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

Answer: A

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62. $\lim_{x \to a} \frac{\sqrt{a+2x}-\sqrt{3a}}{\sqrt{x}-\sqrt{a}}$

A. $-\frac{5}{\sqrt{3}}$

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

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

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

Answer: D

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63. If a function f(x) defined by

$$f(x) = \begin{cases} ax + b, & x \leq -1 \\ 2x^2 + 2bx - \frac{a}{2}, & -1 < x < 1 \\ 7, & x \geq 1 \end{cases}$$

is

continous on R, then (a , b) =

A. (-22 , - 3)

B. (22, - 3)

C. (11, - 6)

D. (-22, - 6)

Answer: A

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64. The derivative of $y=(\sin x)^{x^2}$ with respect to x is

A. $(\sin x)\log(\sin x)$

B. $x^2(\sin x)^{x^2-1}$

C. $2x(\sin x)^{x^2}\cos x+2x(\sin x)^{x^2}\log(\sin x)$

D. $x^2(\sin x)^{x^2-1}\cos x + 2x(\sin x)^{x^2}\log(\sin x)$

Answer: D

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65. If $y = \frac{(x+1)^2\sqrt{x-1}}{(x+4)^3 e^x}$, then $\frac{dy}{dx} =$

A.

$$\frac{(x+1)^3\sqrt{x-1}}{(x+4)^2 e^x}\left[\frac{2}{x+1}+\frac{1}{2(x-1)}-\frac{3}{x+4}-1\right]$$

B.

$$\frac{(x+1)^2\sqrt{x-1}}{(x+4)^3 e^x}\left[\frac{2}{x+1}+\frac{1}{2(x-1)}+\frac{3}{x+4}-1\right]$$

C. $\frac{(x+1)^2\sqrt{x-1}}{(x+4)^3 e^x}\left[\frac{2}{x+1}+\frac{1}{2(x-1)}-\frac{3}{x+4}-1\right]$

D. $\frac{(x+1)\sqrt{x-1}}{(x+4)^2 e^x}\left[\frac{2}{x+1}+\frac{1}{x-1}-\frac{3}{4+x}-1\right]$

Answer: C

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66. The slope of the tangent to the curve $f(x)=\tan h^{-1}(\sin x) at x=\pi$ is

A. 1

B. 0

C. -1

D. -2

Answer: C

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67. The approximate value of

$y = (1.01)^3 + 2(1.01)^{\frac{3}{2}} + 5$ is

A. 8.06

B. 8.04

C. 8.02

D. 8.16

Answer: A

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68. If $y = 2x$ is tangent to the curve $y^2 = ax^3 + b$ at (1, 2) , then (a, b) =

A. (8, 4)

B. $\left(\frac{2}{3}, 1\right)$

C. $\left(\frac{8}{3}, \frac{4}{3}\right)$

D. $\left(\frac{8}{3}, \frac{2}{3}\right)$

Answer: C

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69. An angle between the curves $x^2 - y^2 = 4$ and $x^2 + y^2 = 4\sqrt{2}$ is

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

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

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

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

Answer: B

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70. Let f(x) be continuous on [0, 4] , differentiable on (0, 4) , f(0) = 4 and f(4) = -2 . If $g(x) = \frac{f(x)}{x+2}$, then the value of g'(c) for some Lagrange's constant $c \in (0, 4)$ is

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

B. $\frac{5}{12}$

C. $-\frac{5}{12}$

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

Answer: D

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71. $\int\left(\sqrt{\tan x}+\sqrt{\cot x}\right)dx =$

A. $\sqrt{2}\sin^{-1}(\sin x+\cos x)+c$

B. $\sqrt{2}\cos^{-1}(\sin x+\cos x)+c$

C. $\sqrt{2}\cos^{-1}(\sin x - \cos x) + c$

D. $\sqrt{2}\sin^{-1}(\sin x - \cos x) + c$

Answer: D

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72. $\int \frac{dx}{(2ax + x^2)^{\frac{3}{2}}} =$

A. $\frac{-1}{a^2}\frac{(x+a)}{\sqrt{2ax+x^2}} + c$

B. $\frac{-(x+a)}{\sqrt{2ax+x^2}} + c$

C. $\frac{1}{2a^2}\frac{(x+a)}{\sqrt{2ax+x^2}} + c$

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

Answer: A

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73. If $\int \frac{2dx}{\sqrt{\cot^2 x - \tan^2 x}} = -\sqrt{f(x)} + c$, then f(x) =

A. cot x

B. sin 2x

C. cos 2x

D. tan x

Answer: C

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74. $\int \frac{3^x}{\sqrt{9^x - 1}} dx =$

A. $\frac{1}{\log 3} \log \left| 3^x + \sqrt{9^x - 1} \right| + c$

B. $\frac{1}{\log 3} \log \left| 3^x - \sqrt{9^x - 1} \right| + c$

C. $\frac{1}{\log 9} \log \left| 3^x - \sqrt{9^x - 1} \right| + c$

D. $\frac{1}{\log 9} \log \left| 9^x - \sqrt{9^x - 1} \right| + c$

Answer: A

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75. If $f(x) = \int_1^x \frac{1}{2 + t^4}$ dt ,then

A. $\frac{1}{18} < f(2) < \frac{1}{3}$

B. $f(2) < \frac{1}{2}(\text{ or })f(2) > 2$

C. $f(2) < \frac{1}{3}$

D. $f(2) > \frac{1}{3}$

Answer: A

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76. If $I_n = \int_{\pi/2}^{\infty} e^{-x} x dx \Big]$, then $\frac{I_{2018}}{I_{2016}} =$

A. $\frac{2018 \times 2019}{(2017)^2 + 1}$

B. $\frac{2018 \times 2017}{(2018)^2 + 1}$

C. $\frac{(2018)(2016)}{(2017)^2} + 1\Big)$

D. $\frac{(2018)(2017)}{(2019)^2 + 1}$

Answer: B

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77. The area bounded by the curves $y = 2x^2, y = \max\{x - [x] + [x]\}$ and the lines x = 0, x = 2 (in sq units), is

A. 2

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

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

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

Answer: A

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78. The differential equation corresponding to the family of curves given by $y = a + be^{2x} + ce^{-3x}$ is

A. $y_3 - y_2 + 6y_1 = 0$

B. $y_3 + y_2 - 6y_1 = 0$

C. $y_3 + 6y_2 - y_1 = 0$

D. $y_3 + 6y_2 - y_1 = 0$

Answer: B

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79. The general solution of the differential equation $x^2ydx-(x^3+y^3)dy=0$ is

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

B. $c(x^3-y^3)=x^2$

C. $\log|y|-\frac{x^3}{3y^3}=c$

D. $y^2-x^2=c^2(y^2-x^2)$

Answer: C

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80. The solution of $(1+y^2)dx=(\tan^{-1}y-x)dy$ is

A. $2xe^{\tan^{-1}} = e^{2\tan^{-1}y+c}$

B. $xy + \tan^{-1}y = c$

C. $2\tan^{-1}y = (y^2 - 1)x + c$

D. $xe^{\tan^{-1}}y = e^{\tan^{-1}y}(\tan^{-1}y - 1) + c$

Answer: D

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