MATHS

BOOKS - DEEPTI MATHS (TELUGU ENGLISH)

EAMCET - 2016 TS

Questions

1. The length of the segment of the straight line passing through (3,3) and (7, 6) and off by the coordinate axes is

A. $4/5$

B. $5/4$

C. $7/4$

D. $4/7$

Answer: B

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2. Find the value of k , if the straight lines $y - 3kx + 4 = 0$ and $(2k-1)x + (8k-1)y - 6 = 0$ are perpendicular.

A. $1/6$

B. $-1/6$

C. 1

D. 0

Answer: A

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3. The combined equation of the straight lines of the form y = kx + 1 (where k is an integer such that the point of intersection of each with the line 3x + 4y = 9 has an integer as its x-coordinate is

A. (y+x+1) (y+2x-1) = 0

B. (y+x-1) (y+2x+1) = 0

C. (y+x+1) (y+2x+1) = 0

D. (y+x-1) (y+2x-1) = 0

Answer: D

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4. If the axes are rotated anticlockwise through an angle 90° then the equation $x^{2} = 4ay$ is changed to the equation

A. $y^{2} = 4ax$

B. $x^{2} = -4ay$

C. $y^{2} = -4ax$

D. $x^{2} = 4ay$

Answer: A

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5. If A(5, -4) and B(7, 6) are points in a plane, then the set of all points P(x, y) in the plane such that AP : PB = 2 : is

A. a circle

B. a hyperbola

C. an ellipse

D. a parabola

Answer: A

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6. If on an average, out of 10 ships, one is drowned, then what is the probability that out of 5 ships atleast 4 reach safely ?

A. $14(0.9)^5$

B. $1.4(0.9)^5$

C. $0.14(0.9)^4$

D. $1.4(0.9)^4$

Answer: D

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7. In a family with 4 children, the probability that there are at least two girls is

A. $1/2$

B. $9/16$

C. $3/4$

D. $11/16$

Answer: D

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8. When a pair of six faced fair dice are thrown, the probability that the sum of the numbers on the two dice is greater than 7 , is

A. $1/3$

B. $5/12$

C. $1/2$

D. $1/4$

Answer: B

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9. A five digit number is formed by the digits 1,2,3,4,5 with no digit being repeated. The probability that the number is divisible by 4, is

A. $1/5$

B. $2/5$

C. $3/5$

D. $4/5$

Answer: A

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10. Two events A and B are such that $P(A) = \frac{1}{2}, P(A \mid B) = \frac{1}{4}$ and $P(B \mid A) = \frac{1}{2}$ Consider the following statements :

(I) $P(\overline{A} \mid \overline{B}) = \frac{3}{4}$

(II) A and B are mutually exclusive

(III) $P(A \mid B) + P(A \mid B) = 1$. Then

A. Only (I) is correct

B. Only (I) and (II) are correct

C. Only (I) and (III) are correct

D. Only (II) and (III) are correct

Answer: A

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11. The standard deviation of a, a+d, a + 2d,....a + 2nd is

A. nd

B. n^2d

C. $\frac{\sqrt{n(n+1)}}{3}d$

D. $\frac{\sqrt{n(n+3)}}{3}d$

Answer: C

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12. If the average of the first n numbers in the sequence 148, 146, 144,....., is 125, then n =

A. 18

B. 24

C. 30

D. 36

Answer: B

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13. a is perpendicular to both b and c. The angle between b and c is $\frac{2\pi}{3}$. If $|a| = 2, |b| = 3, |c| = 4$, then $a(b \times c)$ =

A. $18\sqrt{3}$

B. $12\sqrt{3}$

C. $8\sqrt{3}$

D. $6\sqrt{3}$

Answer: B

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14. If a,b,c are unit vectors satisfying the relation $a + b + \sqrt{3}c = 0$, then the angle between a and b is

A. $\pi / 6$

B. $\pi/4$

C. $\pi/3$

D. $\pi/2$

Answer: C

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15. a, b, c are three vectors such that $|a| = 1, |b| = 2, |c| = 3$ and b, c are perpendicular. If projection of b on a is the same as the projection of c on a, then $|a - b + c| =$

A. $\sqrt{2}$

B. $\sqrt{7}$

C. $\sqrt{14}$

D. $\sqrt{21}$

Answer: C

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16. The vectors $2i - 3j + k, I - 2j + 3k, 3i + j - 2k$

A. are linearly dependent

B. are linearly independent

C. form sides of a triangle

D. are coplanar

Answer: B

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17. ABCD is a parallelogram and P is themid point of the side AD. The line BP meets the diagonal AC in Q. Then the ratio AQ : QC =

A. $1:2$

B. $2:1$

C. $1:3$

D. $3:1$

Answer: A

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18. If ABCDEF is a regular hexagon with centre O , then P.T $\overline{AB}+\overline{AC}+\overline{AD}+\overline{AE}+\overline{AF}=3\overline{AD}=6\overline{AO}$

A. $2\overrightarrow{A}O$

B. $3\overrightarrow{A}O$

C. $\overrightarrow{A}O$

D. $6\overrightarrow{A}O$

Answer: D

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19. In ΔABC, if $2R + r = r_2$ then $\angle B =$

A. $\pi/3$

B. $\pi/4$

C. $\pi/6$

D. $\pi/2$

Answer: D

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20. In ΔABC, if $8R^2 = a^2 + b^2 + c^2$, then the triangle is a

A. right angled triangle

B. equilateral triangle

C. scalene triangle

D. obtuse angled triangle

Answer: A

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21. If ΔABC is such that $\angle A = 90^\circ, \angle B \neq \angle C,$ then $\dfrac{b^2 + c^2}{b^2 - c^2}\sin(B - C) =$

A. $1/3$

B. $1/2$

C. 1

D. $3/2$

Answer: C

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22. For $\theta \in \left(0, \dfrac{\pi}{2}\right)$. $\sec h^{-1}(\cos\theta)$ =

A. $\log\left|\tan\left(\dfrac{\pi}{6} + \dfrac{\theta}{2}\right)\right|$

B. $\log\left|\tan\left(\frac{\pi}{3}+\frac{\theta}{2}\right)\right|$

C. $\log\left|\tan\left(\frac{\pi}{4}+\frac{\theta}{2}\right)\right|$

D. $\log\left|\tan\left(\frac{\pi}{4}-\frac{\theta}{2}\right)\right|$

Answer: C

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23. The value of x which satisfies $\sin\left(\cot^{-1} x\right) = \cos\left(\tan^{-1} + (1+x)\right)$ is

A. $-1/2$

B. $1/2$

C. -1

D. 1

Answer: A

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24. If $f(x) = \cos^2 x + \cos^2 2x + \cos^2 3x$, then the number of values of $x \in [0, 2\pi]$ for which $f(x) = 1$ is

A. 4

B. 6

C. 8

D. 10

Answer: D

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25. If $\cos x + \cos y + \cos \alpha = 0$ and $\sin x + \sin y + \sin \alpha = 0,$

then $\cot\left(\frac{x+y}{2}\right)$ =

A. $\sin \alpha$

B. $\cos \alpha$

C. $\tan \alpha$

D. $\cot \alpha$

Answer: D

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26. $\frac{\cos 13^\circ - \sin 13^\circ}{\cos 13^\circ + \sin 13^\circ} + \frac{1}{\cot 148^\circ} =$

A. 1

B. -1

C. 0

D. $1/2$

Answer: C

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27. If $f(x) = x^2 - 2x + 4$ then the set of values of x satisfying $f(x-1) = f(x+1)$ is

A. $\{-1\}$

B. $\{-1, 1\}$

C. $\{1\}$

D. $\{1, 2\}$

Answer: C

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28. The number of real linear functions f(x) satisfying $f(f(x)) = x + f(x)$ is

A. 0

B. 4

C. 5

D. 2

Answer: D

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29. The remainder when $7^n - 6n - 50(n \in N)$ is divided by 36, is

A. 22

B. 23

C. 1

D. 21

Answer: B

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30. Consider the system of equations

ax + by + cz = 2

bx + cy + az = 2

$cx + ay + bz = 2$

where a,b,c are real numbers such that $a + b + c = 0$. Then the system

A. has two solutions

B. in inconsistent

C. has unique solution

D. has infinitely many solutions

Answer: B

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31. Suppose A and B are two square matrices of same order. If A, B are symmetric matrices, then AB - BA is

A. a symmetric matrix

B. a skew symmetric matrix

C. a scalar matrix

D. a triangular matrix

Answer: B

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32. $A(x) = \begin{vmatrix} x+1 & 2x+1 & 3x+1 \\ 2x+1 & 3x+1 & x+1 \\ 3x+1 & x+1 & 2x+1 \end{vmatrix}$ then $\int_0^1 A(x)dx =$

A. -15

B. $-15/2$

C. -30

D. -5

Answer: B

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33. If z = x + iy $iscomp \leq x\nu mbersuch$z^(1-//3) = a+ib , $thenthevalueof$1/(a^2+b^2)(x/a+y/b)=`

A. -1

B. -2

C. 0

D. 2

Answer: B

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34. The locus of z satisfying |z| + |z-1| = 3 is

A. a circle

B. a pair of straight lines

C. an ellipse

D. a parabola

Answer: C

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35. If the point $z = (1+i)(1+2i)(1+3i)\ldots(1+10i)$ lies on a circle with centre at origin and radius r, then r^2 =

A. $10!$

B. $2 \times 3 \times 4 \times \ldots \times 10$

C. $2 \times 5 \times 10 \times \ldots \times 101$

D. $11!$

Answer: C

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36. The minimum value of $|z-1| + |z-5|$ is

A. 5

B. 4

C. 3

D. 2

Answer: B

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37. The number of real roots of $\left|x^2\right| - 5|x| + 6 = 0$ is

A. 2

B. 3

C. 4

D. 1

Answer: C

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38. If α, β are the roots of $x^2 - x + 1 = 0$ then the quadratic equation whose roots are $\alpha^{2015}, \beta^{2015}$ is

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

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

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

D. $x^2 - x - 1 = 0$

Answer: A

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39. If α, β, γ are roots of $x^3 - 5x + 4 = 0$ then $(\alpha^3 + \beta^3 + \gamma^3)^2$ =

A. 12

B. 13

C. 169

D. 144

Answer: D

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40. Suppose α, β, γ are roots of $x^3 + x^2 + 2x + 3 = 0$. If f(x) = 0 is a cubic polynomial equation whose roots are $\alpha + \beta, \beta + \gamma, \gamma + \alpha$ then f(x) =

A. $x^3 + 2x^2 - 3x - 1$

B. $x^3 + 2x^2 - 3x + 1$

C. $x^3 + 2x^2 + 3x - 1$

D. $x^3 + 2x^2 + 3x + 1$

Answer: C

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41. The number of 4 letter words that can be formed with the letters in the word EQUATION with at least one letter repeated is

A. 2400

B. 2408

C. 2416

D. 2432

Answer: C

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42. The number of divisors of $7!$ is

A. 24

B. 72

C. 64

D. 60

Answer: D

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43. The sum of the series $1+\frac{2}{3}\left(\frac{1}{8}\right)+\frac{2\times5\times8}{3\times6\times9}\left(\frac{1}{8}\right)^3+\ldots$ is

A. $\frac{4}{3\sqrt{49}}$

B. $\frac{3\sqrt{49}}{4}$

C. $\frac{4}{3\sqrt{81}}$

D. $\frac{3\sqrt{81}}{4}$

Answer: A

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44. If C_r denotes the binomial coefficient $.^n C_r$ then $(-1)C_0^2 + 2C_1^2 + 5C_2^2 + \ldots. + (3n-1)C_n^2$ =

A. $(3n-2).^{2n} C_n$

B. $\left(\frac{3n-2}{2}\right).^{2n} C_n$

C. $(5+3n).^{2n} C_n$

D. $\left(\frac{3n-5}{2}\right).^{2n} C_{n+1}$

Answer: B

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45.

$$\frac{x+1}{x^4(x+2)}=\frac{A}{x}+\frac{B}{x^2}+\frac{C}{x^3}+\frac{D}{x^4}+\frac{E}{x+2}\Rightarrow B+D+E=$$

A. A+C

B. A-C

C. 2A+C

D. 2A+2C

Answer: A

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46. If $\cos^3\theta+\cos^3\left(\frac{2\pi}{3}+\theta\right)+\cos^3\left(\frac{4\pi}{3}+\theta\right)=a\cos 3\theta,$

then a =

A. $1/4$

B. $3/4$

C. $5/4$

D. $7/4$

Answer: B

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47. The solution of the differential equation $y' = \dfrac{1}{e^{-y} - x}$, is

A. $x = e^{-y}(y + c)$

B. $y + e^{-y} = x + c$

C. $x = e^{y}(y + c)$

D. $x + y = e^{-y} + c$

Answer: A

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48. The solution of the differential equation $3xy' - 3y + (x^2 - y^2)^{1/2} = 0$, satisfying the condition y(1) = 1 is

A. $3\cos^{-1}\left(\frac{y}{x}\right) = \ln|x|$

B. $3\cos\left(\frac{y}{x}\right) = \ln|x|$

C. $3\cos^{-1}\left(\frac{y}{x}\right) = 2\ln|x|$

D. $3\sin^{-1}\left(\frac{y}{x}\right) = \ln|x|$

Answer: A

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49. Let $p \in IR$, then the differential equation of the family of curves $y = (\alpha + \beta x)e^{px}$, where α, β are arbitrary constants, is

A. $y'' = 4py' + p^2y = 0$

B. $y'' - 2py' + p^2y = 0$

C. $y'' + 2py' - p^2y = 0$

D. $y'' + 2py' + p^2y = 0$

Answer: B

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50. If the area bounded by the curves $y = ax^2$ and $x = ay^2 (a > 0)$ is 3 sq. units, then the value of 'a' is

A. $2/3$

B. $1/3$

C. 1

D. 4

Answer: B

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51. $\int_0^{\pi/4}\left[\sqrt{\tan x}+\sqrt{\cot x}\right]=dx$

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

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

C. $\dfrac{3\pi}{\sqrt{2}}$

D. π

Answer: A

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52. $\int_0^{\pi/4} \frac{\sin x + \cos x}{7 + 9\sin 2x} dx =$

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

B. $\frac{\log 3}{36}$

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

D. $\frac{\log 7}{24}$

Answer: D

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53. $\int \frac{2x + 2}{\sqrt{x^2 - 4x - 5}} dx =$

A. $\sqrt{x^2 - 4x - 5} + \log\left|x + \sqrt{x^2 - 4x - 5}\right| + c$

B. $\log\left|\sqrt{x^2 - 4x - 5}\right| + \sqrt{x^2 - 4x - 5} + c$

C. $\sqrt{x^2 - 4x - 5} + 6\log\left|(x-2) + \sqrt{x^2 - 4x - 5}\right| + c$

D. $2\sqrt{x^2 - 4x - 5} + 6\log\left|(x-2) + \sqrt{x^2 - 4x - 5}\right| + c$

Answer: D

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54. $\int \frac{dx}{\cos(x+4)\cos(x+2)} =$

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

B. $\frac{1}{2}\log\left|\frac{\sec(x+2)}{\sec(x+4)}\right| + c$

C. $\frac{1}{\sin 2}\log\left|\frac{\sec(x+4)}{\sec(x+2)}\right| + c$

D. $\log\left|\frac{\sec(x+4)}{\sec(x+2)}\right| + c$

Answer: C

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55. $\int \frac{x^3}{\sqrt{1+x^2}} dx =$

A. $\sqrt{1-x^2} - \frac{x}{3}\left(1+x^2\right)^{3/2} + c$

B. $x\sqrt{1+x^2} + \frac{2}{3}\left(1+x^2\right)^{3/2} + c$

C. $\frac{x^2}{3} - \frac{2}{3}\left(1+x^2\right)^{3/2} + c$

D. $x^2\sqrt{1+x^2} - \frac{1}{3}\left(1+x^2\right)^{1/2} + c$

Answer: C

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56. $\int \frac{(x^2+1)}{x^4+7x^2+1} dx =$

A. $\frac{1}{3}\tan^{-1}\left(\frac{x^2-1}{3x}\right)+c$

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

C. $\frac{1}{3}\tan^{-1}\left(\frac{x^2-1}{x}\right)+c$

D. $\frac{1}{\sqrt{3}}\tan^{-1}\left(\frac{x^2-1}{\sqrt{3}x}\right)+c$

Answer: A

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57. The smallest value of of the constant $m > 0$ for which $f(x) = 9mx - 1 + \frac{1}{x} \geq 0$ for all $x > 0$, is

A. $1/9$

B. $1/16$

C. $1/36$

D. $1/81$

Answer: C

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58. Define $f(x) = \frac{1}{2}[|\sin x| + \sin x], 0 < x \leq 2\pi$. Then f is

A. increasing in $\left(\frac{\pi}{2}, \frac{3\pi}{2}\right)$

B. decreasing in $\left(0, \frac{\pi}{2}\right)$ and increasing in $\left(\frac{\pi}{2}, \pi\right)$

C. increasing in $\left(0, \frac{\pi}{2}\right)$ and decreasing in $\left(\frac{\pi}{2}, (\pi)\right)$

D. increasing in $\left(0, \frac{\pi}{4}\right)$ and decreasing in $\left(\frac{\pi}{4}, \pi\right)$

Answer: C

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59. The area of the triangle formed by the positive x-axis, the tangent and normal to the curve $x^2 + y^2 = 16a^2$ at the point $\left(2\sqrt{2}a, 2\sqrt{2}a\right)$ is

A. a^2

B. $16a^2$

C. $4a^2$

D. $8a^2$

Answer: D

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60. The length of the segment of the tangent line curve $x = a\cos^3 t$, $y = a\sin^3 t$, at any point on the curve cut off by the coordinate axes is

A. 4a

B. a

C. a^2

D. 2a

Answer: B

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61. If $y = a\cos(\sin x) + b\sin(\sin x)$ then $y_2 + (\tan x)y_1 =$

A. 0

B. $4\left(\cos^2 2x\right)y$

C. $-4\left(\cos^2 2x\right)y$

D. $-\left(\cos^2 2x\right)y$

Answer: C

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62. $\frac{d}{dx}\tan^{-1}\left[\frac{\sqrt{1+\sin x}-\sqrt{1-\sin x}}{\sqrt{1+\sin x}+\sqrt{1-\sin x}}\right]=$

A. 1

B. $-1/2$

C. $1/2$

D. -1

Answer: b

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63. If $y=\tan^{-1}\left[\frac{5\cos-12\sin x}{12\cos x+5\sin x}\right]$, then $\frac{dy}{dx}=$

A. 1

B. -1

C. -2

D. $1/2$

Answer: B

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64. continuous at x = 0

Let $f(x) = \begin{cases} (1+|\sin x|)^{\frac{a}{|\sin x|}} & -\frac{\pi}{6} < x < 0 \\ b & x = 0 \\ e^{\tan 2x / \tan 3x} & 0 < x < \frac{\pi}{6} \end{cases}$

Determine a and b such that f(x) continuous at x = 0 .

A. $p = \frac{1}{3}, q = e^{2/3}$

B. $p = 0, q = e^{2/3}$

C. $p = \frac{2}{3}, q = e^{-2/3}$

D. $p = -\frac{2}{3}, q = e^{2/3}$

Answer: D

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65. $\lim_{x \to \infty} \left[\frac{x^2 + x + 3}{x^2 - x + 2}\right]^x =$

A. ∞

B. e

C. e^{4}

D. e^{2}

Answer: D

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66. The image of the point (5, 2, 6) with respect to the plane x+ y + z = 9 is

A. (3, -5, 2)

B. $\left(\frac{7}{2}, -1, 5\right)$

C. $\left(\frac{7}{3}, -\frac{2}{3}, \frac{10}{3}\right)$

D. $\left(\frac{7}{3}, \frac{2}{3}, -\frac{5}{3}\right)$

Answer: C

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67. If the angle betweenthe lines whose direction cosines are $\left(-\frac{2}{\sqrt{21}}, \frac{C}{\sqrt{21}}, \frac{1}{\sqrt{21}}\right)$ and $\left(\frac{3}{\sqrt{54}}, \frac{3}{\sqrt{54}}, -\frac{6}{\sqrt{54}}\right)$ is $\frac{\pi}{2}$, then the value of C is

A. 6

B. 4

C. -4

D. 2

Answer: B

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68. Points A(3, 2, 4), $B\left(\frac{33}{5}, \frac{28}{5}, \frac{38}{5}\right)$, and C(9, 8, 10) are given.

The ratio in which B divides $\overline{AC}$ is

A. $5:3$

B. $2:1$

C. $1:3$

D. $3:2$

Answer: D

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69. Let A $(2\sec\theta, 3\tan\theta)$ and $B(2\sec\phi, 3\tan\phi) where \theta+\phi=\frac{\pi}{2}$ be two point on the hyperbola $\frac{x^2}{4}-\frac{y^2}{9}=1$. If (α, β) is the point of intersection of normals to the hyperbola at A and B ,thenβ =

A. $\frac{-13}{3}$

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

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

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

Answer: A

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70. If S and S'' are the foci of the ellipse $\frac{x^2}{25} + \frac{y^2}{16} = 1$ and if PSP' is a focal chord with SP = 8 then SS'' =

A. 4 + S'P

B. S'P - 1

C. 4 + SP

D. SP - 1

Answer: A

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71. For the ellipse given by $\frac{(x-3)^2}{25} + \frac{(y-2)^2}{16} = 1$, match the equations of the lines given in List - I with those in the List - II

List - I	List - II
i) The equation of the major axis	a) $3x = 34$
ii) The equation of a directrix	b) $y = 2$
iii) The equation of a latus rectum	c) $x + y = 9$
	d) $x = 6$
	e) $x = 3$
	f) $3y = 34$

The correct matching is

A. 1-e, ii-a, iii-d,

B. i-b, ii-f, iii-e

C. i-b, ii-a, iii-e

D. i-b,ii-a, iii-d

Answer: A

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72. The points of intersection of the parabolas $y^2 = 5x$ and $x^2 = 5y$ lie on the line

A. $x + y = 10$

B. $x - 2y = 0$

C. $x - y = 0$

D. $2x - y = 0$

Answer: C

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73. From a point (C, 0) three normals are drawn to the parabola $y^2 = x$. Then

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

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

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

D. $\frac{1}{2} > C > \frac{1}{4}$

Answer: C

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74. The radical centre of the circles $x^2 + y^2 = 1, x^2 + y^2 - 2x - 3 = 0$ and $x^2 + y^2 - 2y - 3 = 0$ is

A. (1,1)

B. (1,-1)

C. (-1,1)

D. (-1, -1)

Answer: D

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75. If the circles $x^2 + y^2 - 2\lambda x - 2y - 7 = 0$ and $3(x^2 + y^2) - 8x + 29y = 0$ are orthogonal then $\lambda =$

A. 4

B. 3

C. 2

D. 1

Answer: D

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76. For all real values of k, the polar of the point (2k, k-4) with respect to $x^2+y^2-4x-6y+1=0$ passes through the point

A. (1, 1)

B. (1, -1)

C. (-3, 1)

D. (3, 1)

Answer: D

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77. The normal to the circle given by $x^2+y^2-6x+8y-144=0$ at (8, 8) meets the circle again at the point

A. (2, -16)

B. (2, 16)

C. (-2, 16)

D. (-2, -16)

Answer: D

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78. The piont where the line 4x - 3y + 7 = 0 touches the circle $x^2 + y^2 - 6x + 4y - 12 = 0$ is

A. (1, 1)

B. (1, -1)

C. (-1, 1)

D. (-1, -1)

Answer: C

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79. The combined equation of three sides of a triangle is $(x^2 - y^2)(2x + 3y - 6) = 0$. If (-2, a) is an interior point of the triangle, then

A. $-2 < \alpha < 0$

B. $-2 < \alpha < 2$

C. $0 < \alpha < 2$

D. $\alpha \geq 2$

Answer: C

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80. The equation on the pair of straight lines through the point (1, 1) and perpendicular to the pair of straight lines $3x^2 - 8xy + 5y^2 = 0$ is

A. $5x^2 + 8xy + 3y^2 - 14x - 18y + 16 = 0$

B. $5x^2 + 8xy + 3y^2 - 18x - 14y + 16 = 0$

C. $5x^2 - 8xy + 3y^2 - 18x - 14y + 32 = 0$

D. $5x^2 - 8xy + 3y^2 - 14x - 18y + 32 = 0$

Answer: B

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