MATHS

BOOKS - KCET PREVIOUS YEAR PAPERS

KARNATAKA 2016

Mathematics

1. The set A has 4 element and the set B has 5 elements then the number of injective mappings that can be deifned from A to B is

A. 144

B. 72

C. 60

D. 120

Answer: d

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2. Let $f: R \to R$ be deifned by $f(X) = 2x + 6$ which is a bijective mapping then $f^{-1}(x)$ is given by

A. $\frac{x}{2} - 3$

B. $2x + 6$

C. associated but not commutative

D. $6x + 2$

Answer: a

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3. Let $*$ be a binaray operation deifned on R by $a * b = \frac{a + b}{4} \forall$ a, b εR then the operation $*$ is

A. commutative and Associative

B. commutative but not Associative

C. Associative but not communative

D. Neither Associtive nor commutative

Answer: b

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4. The value of $1\sin^{-1}\left(\frac{\cos(53\pi)}{5}\right)$ is

A. $\frac{3\pi}{5}$

B. $\frac{-3\pi}{5}$

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

D. $\frac{-\pi}{10}$

Answer: d

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5. If 3 $\tan^{-1} x + \cot^{-1} x \equiv \pi$ then x equal to

A. 0

B. 1

C. -1

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

Answer: b

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6. $\tan^{-1}\left(\frac{x}{y}\right) - \tan^{-1}\left(\frac{x-y}{x+y}\right)$ is

A. 0

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

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

D. π

Answer: b

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7. If x, y, z are all different and not equal to zero and

$$\begin{vmatrix} 1+x & 1 & 1 \\ 1 & 1+y & 1 \\ 1 & 1 & 1+z \end{vmatrix} = 0$$ then the value of $x^{-1}+y^{-1}+z^{-1}$ is equal to

A. xyz

B. $x^{-1}y^{-1}z^{-1}$

C. $-x-y-z$

D. -1

Answer: d

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8. If A is any aquare matrix of order 3×3 then $|3A|$ is equal to

A. $3|A|$

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

C. $27|A|$

D. $9|A|$

Answer: c

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9. If $y = e^{\sin^{-1}(t^2-1)}$ & $x = e^{\sec-1\left(\frac{1}{t^2-1}\right)}$ then $\frac{dy}{dx}$ is equal to

A. $\frac{x}{y}$

B. $\frac{-y}{x}$

C. $\frac{y}{x}$

D. $\frac{-x}{y}$

Answer: B

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10. If $A = \frac{1}{\pi}\begin{bmatrix} \sin^{-1}(\pi x) & \tan^{-1}\left(\frac{x}{\pi}\right) \\ \sin^{-1}\left(\frac{x}{\pi}\right) & \cot^{-1}\left(\frac{x}{\pi}\right) \end{bmatrix}$

$B = \frac{1}{\pi}\begin{bmatrix} -\cos^{-1}(\pi x) & \tan^{-1}\left(\frac{x}{\pi}\right) \\ \sin^{-1}\left(\frac{x}{\pi}\right) & -\tan^{-1}\left(\frac{x}{\pi}\right) \end{bmatrix}$

then A - B is equal to

A. I

B. 0

C. 2I

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

Answer: D

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11. If $x^y = e^{x-y}$ then $\frac{dy}{dx}$ is equal to

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

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

C. $\frac{\log x}{(1+\log x)^2}$

D. $\frac{1}{y}-\frac{1}{x-y}$

Answer: C

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12. If A is matrix of order $m \times n$ and B is a matrix such that AB' and B'A are both defined, the order of the matrix B is

A. $m \times m$

B. $n \times n$

C. $n \times m$

D. $m \times n$

Answer: D

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13. The value of $\frac{f(e^x(1+x)dx)}{\cos^2(e^x x)}$ is equal to

A. $-\cot\left(ex^2\right) + c$

B. $\tan(e^x - x) + c$

C. $\tan(e^x x) + c$

D. $\cot(e^x) + c$

Answer: C

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14. IF x yz are not equal to $\neq 0, \neq 1$ the value of $\begin{vmatrix} \log x & \log y & \log z \\ \log 2x & \log 2y & \log 2z \\ \log 3x & \log 3y & \log 3z \end{vmatrix}$ is equal to

A. $\log(xyz)$

B. $\log(6xyz)$

C. 0

D. $\log(x+y+z)$

Answer: C

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15. The function $f(x) = [x]$ where $[x]$ is the greatest integer function is continous at

A. 1.5

B. 4

C. 1

D. -2

Answer: A

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16. The value of $f e^{x} \frac{x^{2} \tan^{-1} x + \tan^{-1} x + 1}{x^{2} + 1} dx$ is equal to

A. $e^x \tan^{-1} x + C$

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

C. $\tan^{-1}(x^e) + c$

D. $e^{\tan^{-1}} + c$

Answer: A

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17. If $2\vec{a} \cdot \vec{b} = \left|\vec{a}\right| \cdot \left|\vec{b}\right|$ then the angle between $\vec{a}$ & $\vec{b}$ is

A. 30°

B. 0°

C. 90°

D. 60°

Answer: D

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18. If $x^m y^n = (x+y)^{m+n}$ then $\frac{dy}{dx}$ is equal to

A. $\frac{x+y}{xy}$

B. xy

C. 0

D. $\frac{y}{x}$

Answer: D

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19. The general solution of $\cot\theta + \tan\theta = 2$ is

A. $\theta = \frac{n\pi}{2} + (-1)^n \frac{\pi}{8}$

B. $\frac{n\pi}{2} + (-1)^n \frac{\pi}{4}$

C. $\theta = \frac{n\pi}{2} + (-1)^n \frac{\pi}{6}$

D. $\theta = n\pi + (-1)^n \frac{\pi}{8}$

Answer: B

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20. The value of $\int_{-\pi/4}^{\pi/4} \sin^{103} x \cdot \cos^{101} x dx$ is

A. $\left(\frac{\pi}{4}\right)^{103}$

B. $\left(\frac{\pi}{4}\right)^{101}$

C. 2

D. 0

Answer: D

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21. The length of latus rectum of the parabola $4y^2 + 3x + 3y + 1 = 0$ is

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

B. 7

C. 12

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

Answer: D

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22. The value of $\frac{f\left(e^{6ogx} - e^{5\log x}\right)}{e^{4\log x} - e^{3\log x}}dx$ is equal to

A. 0

B. $\frac{x^3}{3}$

C. $\frac{3}{x^3}$

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

Answer: B

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23. The differential coefficient of $\log_{10} x$ with respect to $\log_x 10$ is

A. 1

B. $-(\log_{10} x)^2$

C. $(\log_x 10)^2$

D. $\frac{x^2}{100}$

Answer: B

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24. The slope of the tangent to the curve $x = t^2 + 3t - 8, y = 2t^2 - 2t - 5$ at the point $(2, -1)$ is

A. $\frac{22}{7}$

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

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

D. $\frac{-6}{7}$

Answer: B

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25. The real part of $(1-\cos\theta+I\sin\theta)^{-1}$ is

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

B. $\frac{1}{1+\cos\theta}$

C. $\frac{\tan(\theta)}{2}$

D. $\frac{\cot(\theta)}{2}$

Answer: A

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26. $\int_0^{\pi/2} \frac{\sin^{1000} x dx}{\sin^{1000} x + \cos^{1000} x}$ is equal to

A. 1000

B. 1

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

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

Answer: D

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27. If $1 + \sin\theta + \sin^2\theta + \ldots$ upto $\infty 2\sqrt{3} + 4$, then θ = _____

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

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

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

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

Answer: C

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28. $\lim_{x \to 0} \frac{xe^x - \sin x}{x}$ is equal to

A. 3

B. 1

C. 0

D. 2

Answer: C

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29. If $\tan^{-1}\left(x^2+y^2\right)=\alpha$ then $\frac{dy}{dx}$ is equal to

A. $\frac{-x}{y}$

B. xy

C. $\frac{x}{y}$

D. $-xy$

Answer: A

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30. The simplified form of $i^n + i^{n+1} + i^{n+2} + i^{n+3}$ is

A. 0

B. 1

C. -1

D. i

Answer: A

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31. The two curves $x^3 - 3xy^2 + 2 = 0$ and $3x^2y - y^3 = 2$

A. Touch each other

B. Cut each other at right angle

C. Cut at an angle $\frac{\pi}{3}$

D. Cut at an angle $\frac{\pi}{4}$

Answer: B

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32. The equation of the normal to the curve $y(1+x^2) = 2 - x$ where the tangent crosses x -axis is

A. $5x - y - 10 = 0$

B. $x - 5y - 10 = 0$

C. $5x + y + 10 = 0$

D. $x + 5y + 10 = 0$

Answer: A

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33. The maximum value of $\left(\frac{1}{x}\right)^x$ is

A. e

B. e^x

C. $e^{\frac{1}{x}}$

D. $\left(\frac{1}{e}\right)^e$

Answer: C

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34. The solution for the differential equation $\frac{dy}{y} + \frac{dx}{x} = 0$ is

A. $\frac{1}{y} + \frac{1}{x} = C$

B. $\log x \cdot \log y = c$

C. $xy = c$

D. $x + y = c$

Answer: C

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35. The order and degree of the differential equation

$$\left[1+\left(\frac{dy}{dx}\right)^2+\sin\left(\frac{dy}{dx}\right)\right]^{3/4}=\frac{d^2y}{dx^2}$$

A. order = 2, degree = 3

B. order = 2, degree = 4

C. order = 2, degree = $\frac{3}{4}$

D. order = 2, degree = not defined

Answer: D

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36. If $\vec{a}$ and $\vec{b}$ are unit vectors, then angle between $\vec{a}$ and $\vec{b}$ for $\sqrt{3}\vec{a} - \vec{b}$ to be unit vector is

A. 30°

B. 45°

C. 60°

D. 90°

Answer: A

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37. The sum of 1^{st} n terms of the series

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

A. $\frac{n+2}{3}$

B. $\frac{n(n+2)}{3}$

C. $\frac{n(n-2)}{3}$

D. $\frac{n(n-2)}{6}$

Answer: B

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38. The 11th term in the expansion of $\left(x+\frac{1}{\sqrt{x}}\right)^{14}$ is

A. $\frac{999}{x}$

B. $\frac{1000}{x}$

C. i

D. $\frac{x}{1001}$

Answer: B

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39. Suppose $\vec{a} + \vec{b} + \vec{c} = 0, \left|\vec{a}\right| = 3, \left|\vec{b}\right| = 5, \left|\vec{c}\right| = 7$, then the angle between $\vec{a}$ & $\vec{b}$ is

A. π

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

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

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

Answer: C

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40. If a = 3, b = 4, c = 5 each one of $\vec{a}$, $\vec{b}$ & $\vec{c}$ is perpendicular to the sum of the remaining then $\left|\vec{a}+\vec{b}+\vec{c}\right|$ is equal to

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

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

C. $5\sqrt{2}$

D. $\sqrt{5}$

Answer: C

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41. If the straight lines $2x + 3y - 3 = 0$ and $x + ky + 7 = 0$ are perpendicular then the value of k is

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

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

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

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

Answer: C

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42. The rate of change of area of a circle with respect to its radius at r = 2 cms is

A. 4

B. 2π

C. 2

D. 4π

Answer: D

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43. Find the value of $\tan\left(\frac{\pi}{8}\right)$?

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

B. $\sqrt{2}+1$

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

D. $1-\sqrt{2}$

Answer: C

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44. Area lying between the curves $y^2 - 2x$ and $y = x$ is

A. $\frac{2}{3}$sq.units

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

C. $\frac{1}{4}$sq. units

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

Answer: A

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45. If $P(A \cap B) = \frac{7}{10}$ and $P(B) = \frac{17}{20}$, where P stands for probability then P (A/B) is equal to

A. $\frac{7}{8}$

B. $\frac{17}{20}$

C. $\frac{14}{17}$

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

Answer: C

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46. The coefficient of variation of two distributions are 60 and 70. The standard deviation are 2t and 16 respectively. Then their mean is

A. 35

B. 23

C. 28.25

D. 22.85

Answer: A::D

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47. Two cards are drawn at randrom from a pack of 52 cards. The probability of these two being "Aces" is

A. $\frac{1}{26}$

B. $\frac{1}{221}$

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

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

Answer: B

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48. IF $\sin^{-1} x + \sin^{-1} y = \frac{\pi}{2}$, then x^2 is equal to

A. $1 - y^2$

B. y^2

C. 0

D. $\sqrt{1 - y}$

Answer: A

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49. The value of $\int_2^8 \frac{\sqrt{10-x}}{\sqrt{x}+\sqrt{10-x}}dx$ is

A. 10

B. 0

C. 8

D. 3

Answer: D

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50. Write the converse and contrapositive of the statement " If x is a prime number then x is odd "

A. If x is not a prime number then x is odd.

B. If x is not and odd number then x is not a prime number.

C. If x is a prime number then it is not odd.

D. If x is not a prime number then x is not odd.

Answer: D

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51. Two dice are thrown simultaneously, the probability of obtaining a total score of 5 is

A. $\frac{1}{18}$

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

C. $\frac{1}{9}$

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

Answer: C

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52. If $A = \begin{bmatrix} \cos 2thet & -\sin 2\theta \\ \sin 2\theta & \cos 2\theta \end{bmatrix}$ and $A + A^T = 1$, where I is the unit matrix of 2×2 & A^T is the transpose of A. then the value of θ is equla to

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

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

C. π

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

Answer: A

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53. IF $A = \begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$ then $A^2 - 5A$ is equal to

A. I

B. $-I$

C. $7I$

D. $-7I$

Answer: D

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54. Find a value of x for which $x\left(\hat{i}+\hat{j}+\hat{k}\right)$ is a unit vector.

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

B. $\pm\sqrt{3}$

C. ± 3

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

Answer: A

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55. If $x = 2 + 3\cos\theta$ and $y = 1 - 3\sin\theta$ represent a circle then the centre and radius is

A. $(2, 1)9$

B. $(2, 1), 3$

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

D. $(-2, -1), 3$

Answer: B

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56. The vector equation of the plane which is at a distance $\frac{3}{\sqrt{14}}$ from the origin and the normal from the origin is $2\hat{i} + -3\hat{j} + \hat{k}$ is

A. $\vec{r} \cdot \left(2\hat{i} + 3\hat{j} + \hat{k}\right) = 3$

B. $\vec{r} \cdot \left(\hat{i} + \hat{j} + \hat{k}\right) = 9$

C. $\vec{r} \cdot \left(\hat{i} + 2\hat{j}\right) = 3$

D. $\vec{r} \cdot \left(2\hat{i} + \hat{k}\right) = 3$

Answer: A

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57. Find the co-ordinates of the foot fo the perpendicular drawn from the origin to the plane $5y + 8 = 0$

A. $\left(0, -\frac{18}{5}, 2\right)$

B. $\left(0, \frac{8}{5}, 2\right)$

C. $\left(\frac{8}{25}, 0, 0\right)$

D. $\left(0, -\frac{8}{5}, 0\right)$

Answer: D

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58. If $\cos\alpha, \cos\beta, \cos\gamma$ are the direction cosines fo a vector $\vec{a}$, then $\cos 2\alpha + \cos 2\beta + \cos 2\gamma$ is equal to

A. 2

B. 3

C. -1

D. 0

Answer: C

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59. The value of the $\sin 1^\circ + \sin 2^\circ + \ldots + \sin 359^\circ$ is equal to

A. 0

B. 1

C. -1

D. 180

Answer: A

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60. Integrating factor of $x\frac{dy}{dx} - y = x^4 - 3x$ is

A. x

B. $\log x$

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

D. $-x$

Answer: C

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