MATHS

BOOKS - KCET PREVIOUS YEAR PAPERS

KARNATAKA CET 2017

Mathematics

1. The distance of the point (-2, 4, -5) from the line $\frac{x+3}{3}=\frac{y-4}{5}=\frac{z+8}{6}$ is

A. $\frac{\sqrt{37}}{10}$

B. $\frac{37}{\sqrt{10}}$

C. $\sqrt{\frac{37}{10}}$

D. $\frac{37}{10}$

Answer: C

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2. If A is a square matrix of order 3×3, then |KA| is equal to

A. K|A|

B. $K^2|A|$

C. 3K|A|

D. $K^3|A|$

Answer: D

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3. Equation of line passing through the point (1,2) and perpendicular to the line y = 3x - 1 is

A. x-3y=0

B. x+ 3y= 0

C. x+3y -7 =0

D. x+3y+7= 0

Answer: C

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4. General solution of differential equation $\frac{dy}{dx} + y = 1(y \neq 1)$

A. $\log\left|\frac{1}{1-y}\right| = x + C$

B. $\log|(1-y)| = x + C$

C. $\log|1+y| = x + C$

D. $\log\left|\frac{1}{1-y}\right| = -x + C$

Answer: A

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5. Verify Mean Value Theorem for the function $f(x) = x^2$ in the interval [2,4].

A. 2

B. 4

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

D. 3

Answer: D

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6. The value of $\lim_{\theta \to 0} \left(\frac{1 - \cos 4\theta}{1 - \cos 6\theta} \right)$ is

A. $\frac{9}{4}$

B. $\frac{4}{9}$

C. $\frac{9}{3}$

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

Answer: B

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

A. 0

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

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

D. 1

Answer: D

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8. If $\left(\frac{1+i}{1-i}\right)^m = 1$, then the least positive integral value of m is

A. 4

B. 1

C. 2

D. 3

Answer: A

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9. $\int_{-5}^{5} |x+2| dx$ is equal to

A. 28

B. 29

C. 27

D. 30

Answer: B

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10. $\int \frac{\cos 2x - \cos 2\theta}{\cos x - \cos \theta} dx$ is equal to

A. 2(sinx + x cos theta) + C

B. 2(sinx - x cos theta) + C

C. 2(sinx - 2x cos theta) + C

D. 2(sinx - 2x costheta) + C

Answer: A

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11. The area of the region bounded by the curve $y = x^2$ and the line y = 16 is

A. $\frac{256}{3}$ sq. units

B. $\frac{128}{3}$ sq. units

C. $\frac{32}{3}$ sq. units

D. $\frac{64}{3}$ sq. units

Answer: A

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12. If A and B are finite sets and $A \subset B$, then

A. $n(A \cup B) = n(B)$

B. $n(A \cap B) = n(B)$

C. $n(A \cap B) = \phi$

D. $n(A \cup B) = n(A)$

Answer: A

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13. If a matrix A is both symmetric and skew symmetric, then

A. A is diagonal matrix

B. A is a zero matrix

C. A is scalar matrix

D. A is square matrix

Answer: B

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14. $\begin{vmatrix} 3 & x \\ x & 1 \end{vmatrix} = \begin{vmatrix} 3 & 2 \\ 4 & 1 \end{vmatrix}$ then x is equal to

A. 8

B. 4

C. $\pm 2\sqrt{2}$

D. 2

Answer: C

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15. Find the general solution of the differential equation $x\frac{dy}{dx} + 2y = x^2, (x \neq 0)$

A. $e^{\log x}$

B. log|x|

C. x+3y -7 =0

D. x^2

Answer: D

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16. The perpendicular distance of the point P(6,7,8) from XY-plane is

A. 7

B. 6

C. 8

D. 5

Answer: C

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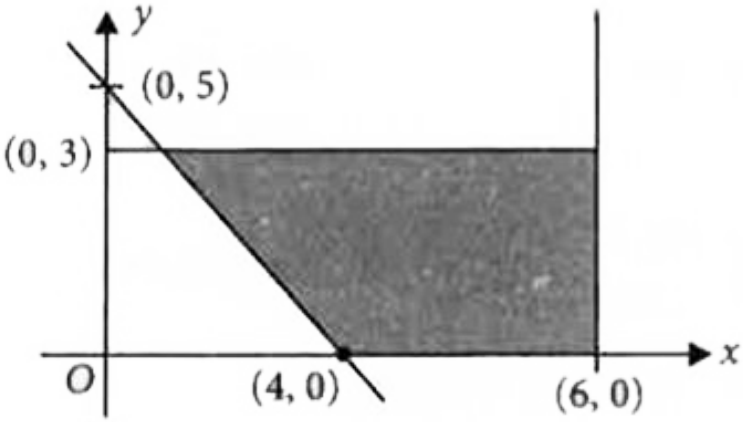
17. The shaded region in the figure is the solution set of the inequations



A. $5x + 4y \leq 20, x \leq 6, y \leq 3, x \geq 0, y \geq 0$

B. $5x + 4y \geq 20, x \leq 6, y \geq 3, x \geq 0, y \geq 0$

C. $5x + 4y \geq 20, x \leq 6, y \leq 3, x \geq 0, y \geq 0$

D. $5x + 4y \geq 20, x \geq 6, y \leq 3, x \geq 0, y \geq 0$

Answer: C

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18. If an LPP admits optimal solution at two consecutive vertices of a feasible region, then

A. the required optimal solution is at the midpoint of the line joining two points.

B. the optimal solution occurs at every point on the line joining these two paints.

C. the LPP under consideration is not solvable.

D. the LPP under consideration must be reconstructed.

Answer: B

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19. 3 + 5 + 7 + ... to n terms is

A. n^2

B. n(n-2)

C. n(n+2)

D. $(n+1)^2$

Answer: C

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20. If $2\begin{bmatrix} 1 & 3 \\ 0 & x \end{bmatrix} + \begin{bmatrix} y & 0 \\ 1 & 2 \end{bmatrix} = \begin{bmatrix} 5 & 6 \\ 1 & 8 \end{bmatrix}$, then the value of x and y are

A. x = 3, y = 3

B. x = -3, y = 3

C. x = 3, y = -3

D. x = -3, y = -3

Answer: A

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21. The derivative of $\cos^{-1}(2x^2 - 1)$ w.r.t $\cos^{-1} x$ is

A. 2

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

C. 1- x^2

D. $\frac{-1}{2\sqrt{1-x^2}}$

Answer: A

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22. A box has 100 pens of which 10 are defective. The probability that out of a sample of 5 pens drawn one by one with replacement and atmost one is defective is

A. $\frac{9}{10}$

B. $\frac{1}{2}\left(\frac{9}{10}\right)^4$

C. $\left(\frac{9}{10}\right)^5 + \frac{1}{2}\left(\frac{9}{10}\right)^4$

D. $\frac{1}{2}\left(\frac{9}{10}\right)^5$

Answer: C

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23. If y = log (log x), then $\frac{d^2y}{dx^2}$ is equal to

A. $\frac{1+\log x}{x^2 \log x}$

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

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

D. $-\frac{1+\log x}{x^2\log x}$

Answer: B

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24. $\int\frac{(x+3)e^x}{(x+4)^2}dx$ is equal to

A. $\frac{e^x}{x+4}+C$

B. $\frac{e^x}{(x+4)^2}+C$

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

D. $\frac{1}{(x+4)^2}+C$

Answer: A

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25. $\int_0^{\pi/2} \frac{dx}{a^2\cos^2 x + b^2\sin^2 x} =$

A. $\frac{\pi a}{4b}$

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

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

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

Answer: C

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26. Let $f: R \to R$ be defined by $f(x) = x^4$, then

A. f is one-one but not onto

B. f is neither one-one nor onto

C. f is one-one and onto

D. f may be one-one and onto

Answer: B

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27. The point on the curve $y^2 = x$ where the tangent makes an angle $\frac{\pi}{4}$ with X-axis is

A. (1,1)

B. $\left(\frac{1}{4}, \frac{1}{2}\right)$

C. $\left(\frac{1}{2}, \frac{1}{4}\right)$

D. (4, 2)

Answer: B

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28. The total number of terms in the expansion of $(x+a)^{47}-(x-a)^{47}$ after simplification is

A. 24

B. 96

C. 47

D. 48

Answer: A

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29. The function $f(x) = x^2 + 2x - 5$ is strictly increasing in the interval

A. $[-1, \infty)$

B. $(-\infty, -1)$

C. $(-\infty, -1]$

D. $(-1, \infty)$

Answer: D

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30. The degree of the differential equation

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

A. 1

B. 4

C. 2

D. 3

Answer: A

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31. Binary operation * on R - {-1} defined by $a \cdot b = \frac{a}{b+a}$

A. * is associative and commutative

B. * is neither associative nor commutative

C. * is commutative but not associative

D. * is associative but not commutative

Answer: B

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32. The plane 2x - 3y + 62 - 11 = 0 makes an angle $\sin^{-1}(\alpha)$ with X-axis. The value of α is equal to

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

B. $\frac{2}{7}$

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

D. $\frac{3}{7}$

Answer: B

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33. If coefficient of variation is 60 and standard deviation is 24, then arithmetic mean is

A. $\frac{20}{7}$

B. $\frac{7}{20}$

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

D. 40

Answer: D

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34. 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 a prime number, then x is not odd.

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

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

Answer: D

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35. The probability distribution of X is

X	0	1	2	3
$P(X)$	0.3	k	$2k$	$2k$

The value of k is

A. 0.7

B. 0.3

C. 1

D. 0.14

Answer: D

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36. $\int \sqrt{x^2+2x+5}dx$ is equal to

A.

$$(x+1)\sqrt{x^2+2x+5}-2\log\left|x+1+\sqrt{x^2+2x+5}\right|+C$$

B.

$$\frac{1}{2}(x+1)\sqrt{x^2+2x+5}-2\log\left|x+1+\sqrt{x^2+2x+5}\right|+C$$

C.

$$(x+1)\sqrt{x^2+2x+5}+2\log\left|x+1+\sqrt{x^2+2x+5}\right|+C$$

D.

$$(x+1)\sqrt{x^2+2x+5}+\frac{1}{2}\log\left|x+1+\sqrt{x^2+2x+5}\right|+C$$

Answer: B

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37. If ${}^{m}C_{12} = {}^{n}C_{8}$ then n is equal to

A. 12

B. 26

C. 6

D. 20

Answer: D

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38. if $y = \begin{vmatrix} f(x) & g(x) & h(x) \\ l & m & n \\ a & b & c \end{vmatrix}$, then $\frac{dy}{dx}$ is equal to

A. $\begin{vmatrix} f'(x) & g'(x) & h'(x) \\ l & m & n \\ a & b & c \end{vmatrix}$

B. $\begin{vmatrix} l & m & n \\ f'(x) & g'(x) & h'(x) \\ a & b & c \end{vmatrix}$

C. $\begin{vmatrix} f'(x) & l & a \\ g'(x) & m & b \\ h'(x) & n & c \end{vmatrix}$

D. $\begin{vmatrix} l & m & n \\ a & b & c \\ f'(x) & g'(x) & h'(x) \end{vmatrix}$

Answer: A::C::D

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39. if $\tan^{-1} x + \tan^{-1} y = \frac{4\pi}{5}$ then $\cot^{-1} x + \cot^{-1} y$ is equal to

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

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

C. $\frac{2\pi}{5}$

D. π

Answer: A

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40. The range of the function $f(x) = \sqrt{9 - x^2}$

A. [0,3]

B. (0,3]

C. (0,3)

D. [0,3)

Answer: A

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41. Two events A and B will be independent if

A. $P(A' \cap B') = (1 - P(A)(1 - P(B))$

B. A and B are mutually exclusive

C. P(A) + P(B) = 1

D. P(A) = P(B)

Answer: A

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42. The eccentricity of the ellipse $\frac{x^2}{36} + \frac{y^2}{16} = 1$ is

A. $\frac{2\sqrt{5}}{6}$

B. $\frac{2\sqrt{13}}{4}$

C. $\frac{2\sqrt{5}}{4}$

D. $\frac{2\sqrt{13}}{6}$

Answer: A

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43. 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. 45°

B. 30°

C. 90°

D. 60°

Answer: B

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44. if $\overrightarrow{a} = 2\hat{i} + \lambda\hat{j} + \hat{k}$ and $\overrightarrow{b} = \hat{i} + 2\hat{j} + 3\hat{k}$ are orthogonal then the value of λ

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

B. 1

C. $-\frac{5}{2}$

D. 0

Answer: C

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45. The value of $\cos^2 45^\circ - \sin^2 15^\circ$ is

A. $\frac{\sqrt{3}+1}{2\sqrt{2}}$

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

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

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

Answer: B

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46. The range of $\sec^{-1} x$ is

A. $[0, \pi]$

B. $[0, \pi] - \left\{\frac{\pi}{2}\right\}$

C. $\left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$

D. $\left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$

Answer: B

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47. If $\vec{a}, \vec{b}, \vec{c}$ are unit vectors such that $\vec{a} + \vec{b} + \vec{c} = \vec{0}$, then the value of $\vec{a}.\vec{b} + \vec{b}.\vec{c} + \vec{c}\vec{a}$ is equal to

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

B. 3

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

D. 1

Answer: A

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48. $\int_{-(\pi/2)}^{\pi/2} \frac{dx}{e^{\sin x} + 1}$ is equal to

A. 1

B. 0

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

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

Answer: C

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49. The rate of change of volume of a sphere with respect to its surface area when the radius is 4 cm is

A. $2cm^3/cm^2$

B. $4cm^3/cm^2$

C. $8cm^3/cm^2$

D. $6cm^3/cm^2$

Answer: A

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50. $\int_0^{\pi/2} \frac{\tan^7 x}{\cot^7 x + \tan^7 x} dx$

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

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

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

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

Answer: A

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51. If $|x-2| \leq 1$, then

A. $x \in (1, 3)$

B. $x \in (-1, 3)$

C. $x \in [1, 3]$

D. $x \in [-1, 3)$

Answer: C

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52. $\int_{0.2}^{3.5} [x] dx$ is equal to

A. 3.5

B. 4.5

C. 3

D. 4

Answer: B

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53. The area of triangle with vertices (K, 0), (4,0), (0, 2) is 4 square units, then value of K is

A. 8

B. 0 or -8

C. 0

D. 0 or 8

Answer: D

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54. If $F(x) = \begin{cases} Kx^2 & \text{if } x \leq 2 \\ 3 & \text{if } x > 2 \end{cases}$ is continuous at x = 2, then the value of K is

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

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

C. 3

D. 4

Answer: B

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

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

then $A - B$ is equal to :

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

B. I

C. O

D. 2I

Answer: C

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56. If $f(x) = 8x^3$, $g(x) = x^{(1/3)}$, then fog(x) is

A. 8^3x

B. $8x^3$

C. 8x

D. $(8x)^{1/3}$

Answer: C

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57. $\Delta = \begin{vmatrix} Ax & x^2 & 1 \\ By & y^2 & 1 \\ Cz & z^2 & 1 \end{vmatrix}$ and $\Delta_1 = \begin{vmatrix} A & B & C \\ x & y & z \\ zy & zx & xy \end{vmatrix}$

A. $\Delta = -\Delta_1$

B. $\Delta = \Delta_1$

C. $\Delta = 2\Delta_1$

D. $\Delta \neq 2\Delta_1$

Answer: B

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58. if $\sin x = \frac{2t}{1+t^2}, \tan y = \frac{2t}{1-t^2}$ then $\frac{dy}{dx}$ is equal to

A. 1

B. -1

C. 2

D. 0

Answer: A

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59. Reflection of the point (α, β, γ) in XY plane is

A. $(0, 0, \gamma)$

B. $(\alpha, \beta, -\gamma)$

C. $(-\alpha, -\beta, \gamma)$

D. $(\alpha, \beta, 0)$

Answer: B

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60. Area of the region bounded by the curve y = cos x, x = 0 and $x = \pi$ is

A. 2 sq. units

B. 3 sq. units

C. 4 sq. units

D. 1 sq. units

Answer: A

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