MATHS

BOOKS - KCET PREVIOUS YEAR PAPERS

KARNATAKA CET 2002

Mathematics Mcq S

1. If $\left(x_i, \frac{1}{x_i}\right), i = 1, 2, 3, 4$ are four distinct points on a circle, then $x_1 \cdot x_2 \cdot x_3 \cdot x_4 =$

A. 4

B. -1

C. 1

D. 0

Answer:

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2. If two circle $(x-1)^2+(y-3)^2=r^2$ and $x^2+y^2-8x+2y+8=0$ intersect in two distinct points, then

A. $r<2$

B. $8<r<10$

C. $r=2$

D. $2 < r < 8$

Answer:

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3. Orbit of the earth around the sun is an ellipse with sun at one of its foci. If the semi-major axis is 150 million kilometers and the eccentricity is $\frac{1}{60}$, the difference between the maximum and the minimum distance between the earth and the sun is

A. 20 million km

B. 5 million km

C. 50 million km

D. 2.5 million km

Answer:

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4. If $\cos^{-1}\sqrt{p} + \cos^{-1}\sqrt{1-p} + \cos^{-1}\sqrt{1-q} = \frac{3\pi}{4}$ then the value of q is

A. $1/\sqrt{2}$

B. 1

C. $1/2$

D. $1/3$

Answer:

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5. If $\tan^{-1}\frac{x+1}{x-1}+\tan^{-1}\frac{x-1}{x}=\tan^{-1}(-7)$ then the value of x is

A. 0

B. -2

C. 1

D. 2

Answer:

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6. If $\log_2 7 = x,$ then x is

A. a rotational number such that $0 < x < 2$

B. an irrational number

C. a rotational number

D. a rotational number such that $2 < x < 3$

Answer: A::B

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7. Which of the following linear congruences has no solution?

A. $3x \equiv 2 \pmod 6$

B. $4x \equiv 1 \pmod 3$

C. $2x \equiv 1 \pmod 3$

D. $5x \equiv 3 \pmod 4$

Answer:

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8. The value of $\lim_{x \to \pi} \frac{\sqrt{2 + \cos x} - 1}{(\pi - x)^2}$ is

A. $1/4$

B. 2

C. $1/2$

D. 0

Answer:

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9. Let $n \geq 5$ and $b \neq 0$. In the binomial expansion of $(a-b)^n$, the sum of the 5^{th} and 6^{th} terms is zero. Then a/b equals

A. $\frac{5}{n-4}$

B. $\frac{1}{5(n-4)}$

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

D. $\frac{n-4}{5}$

Answer:

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10. The digit in the unit place of the number $183!+3^{183}$ is

A. 6

B. 7

C. 0

D. 3

Answer:

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11. If $3x^2 + xy - y^2 - 3x + 6y + K = 0$ represents a pair of lines , then K=

A. 9

B. 1

C. -9

D. 0

Answer:

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12. The value of $\cos^2\frac{\pi}{12} + \cos^2\frac{\pi}{4} + \cos^2\frac{5\pi}{12}$ is

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

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

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

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

Answer:

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13. If $0 < x < \frac{\pi}{2}$, then the largest angle of a triangle whose sides are 1, sinx, cosx is

A. $\pi/3$

B. $\pi/2$

C. x

D. $(\pi/2) - x$

Answer:

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14. The general solution of the equation $\sin\theta + \cos\theta = 1$ is

A. $\theta = 2n\pi + \frac{\pi}{2}, n = 0, \pm 1, \pm 2$

B. $\theta = n\pi + \{(-1)^n + 1\}\frac{\pi}{4}, n = 0, \pm 1, \pm 2$

C. $\theta = n\pi + \{(-1)^n - 1\}\frac{\pi}{4}, n = 0, \pm 1, \pm 2$

D. $\theta = 2n\pi, n = 0, \pm 1, \pm 2$

Answer:

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15. The value of $\sum_{k=1}^{6}\left(\sin\frac{2\pi k}{7}-I\cos\frac{2\pi k}{7}\right)$ is

A. i

B. 0

C. $-i$

D. -1

Answer:

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16. If $f(x) = \begin{cases} x \sin\left(\frac{1}{x}\right), \text{if } x \neq 0 \\ 0 \quad , \text{if } x = 0 \end{cases}$ then at x=0 the function f is

A. continuous but not differentiable

B. differentiable but not continuous

C. continuous and differentiable

D. not continuous

Answer:

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

A. -1

B. $\sin 2x$

C. $\cos 2x$

D. 0

Answer:

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18. The differential of e^{x^3} with respect to log x is

A. e^{x^3}

B. $3x^2e^{x^3} + 3x^2$

C. $3x^2e^{x^3}$

D. $3x^3e^{x^3}$

Answer:

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19. If $p \to (q \vee r)$ is false, then the truth values of p,q,r are respectively

A. F,T

B. F,F

C. T,T

D. T,F

Answer:

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20. If 5 is one root of the equation $\begin{vmatrix} x & 3 & 7 \\ 2 & x & -2 \\ 7 & 8 & x \end{vmatrix} = 0$ then the other two roots of the equation are:

A. $-2, -7$

B. $-2, 7$

C. $2, -7$

D. $2, 7$

Answer:

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21. If $\vec{a}, \vec{b}, \vec{c}$ are mutually perpendicular unit vectors then $\left|\vec{a}+\vec{b}+\vec{c}\right|$ is equal to

A. 3

B. $\sqrt{3}$

C. 0

D. 1

Answer:

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22. If $x = 2\cos t + \cos 2t, y = 2\sin t - \sin 2t$, then $\frac{dy}{dx}$ at $t = \frac{\pi}{4}$ is

A. $1-\sqrt{2}$

B. $-\left(1+\sqrt{2}\right)$

C. $\sqrt{2}$

D. $1/\sqrt{2}$

Answer:

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23. The value of $\int \frac{dx}{\sqrt{2x-x^2}}$ is:

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

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

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

D. $-\sqrt{2x - x^2} + c$

Answer:

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24. Which of the following functions is a solution of the differential equation $\left(\frac{dy}{dx}\right)^2 - x\left(\frac{dy}{dx}\right) + y = 0$?

A. $y = 2x - 4$

B. $y = 2x^2 - 4$

C. $y = 2$

D. $y = 2x$

Answer:

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25. $y = ae^{mx} + be^{-mx}$ satisfies which of the following differential equations?

A. $\frac{dy}{dx} + my = 0$

B. $\frac{dy}{dx} - my = 0$

C. $\frac{d^2y}{dx^2} - m^2y = 0$

D. $\frac{d^2y}{dx^2} + m^2y = 0$

Answer:

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26. Solution of the differential equation $\frac{dx}{x} + \frac{dy}{y} = 0$ is

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

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

C. $xy = c$

D. $x + y = c$

Answer:

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27. Let the function f:$R \to R$ be defined by $f(x) = 2x + \cos x$. Then f

A. has maximum at x=0

B. has minimum at x=π

C. is an increasing function

D. is a decreasing function

Answer:

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28. The perimeter of a sector is p. the area of the sector is maximum when it radius is

A. $1/\sqrt{p}$

B. $p/2$

C. $p/4$

D. $\sqrt{p}$

Answer:

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29. The equation to the tangent to the curve $y = be^{x/a}$ at the point where $x = 0$ is

A. $ax + by = 1$

B. $\frac{x}{a} - \frac{y}{b} = 1$

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

D. $ax-by=1$

Answer:

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30. The value of $\int x^3 \log x dx$ is:

A. $\frac{1}{16}\left(4x^4 \log x - x^4 + c\right)$

B. $\frac{1}{8}\left(x^4 \log x - 4x^4 + c\right)$

C. $\frac{1}{16}\left(4x^4 \log x + x^4 + c\right)$

D. $\frac{x^4 \log x}{4} + c$

Answer:

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31. The value of $\int_0^{\pi} \frac{dx}{5+3\cos x}$ is

A. $\pi/4$

B. $\pi/8$

C. $\pi/2$

D. 0

Answer:

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32. The false statement in the following is

A. $p \wedge (\sim p)$ is a contradiction

B. $(p \to q) \leftrightarrow (\sim p \to \sim p)$ is a contradiction

C. $\sim(\sim p) \leftrightarrow p$ is a tautology

D. $p \vee (\sim p)$ is a tautology

Answer:

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33. If the vectors $3\hat{i} + \hat{j} - 2\hat{k}, \hat{i} + 2\hat{j} - 3\hat{k}, 3\hat{i} + \lambda\hat{j} + 5\hat{k}$ are co-planar, the value of λ is

A. -4

B. 4

C. 8

D. -8

Answer:

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34. Equations of the tangent and the normal drawn at the point (6,0) on the ellipse $\frac{x^2}{36}+\frac{y^2}{9}=1$ respectively are:

A. x=6,y=0

B. y+x-6=0, y-x+6=0

C. x=0, y=3

D. x=-6, y=0

Answer:

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35. The equation to the parabola whose focus is $(1, -1)$ and the directrix is x+y+7=0 is

A. $x^2 + y^2 - 2xy - 18x - 10y = 0$

B. $x^2 - 18x - 10y - 45 = 0$

C. $x^2 + y^2 - 18x - 10y - 45 = 0$

D. $x^2 + y^2 - 2xy - 18x - 10y - 45 = 0$

Answer:

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36. If $\omega = -\frac{1}{2} + i\frac{\sqrt{3}}{2}$, the value of $\begin{bmatrix} 1 & \omega & \omega^2 \\ \omega & \omega^2 & 1 \\ \omega^2 & 1 & \omega \end{bmatrix}$ is

A. 0

B. 3

C. -1

D. 1

Answer:

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37. Two intersecting circles have their radii 1 and $\sqrt{3}$ meters. The distance between their centres is 2 meters. Then the overlapping area in sq. meters is

A. $\frac{19\pi + 6\sqrt{3}}{6}$

B. $\frac{5\pi + 6\sqrt{3}}{6}$

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

D. $\frac{5\pi - 6\sqrt{3}}{6}$

Answer:

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38. The height of the cylinder of maximum volume inscribed in a sphere of radius 'a' is

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

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

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

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

Answer:

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39. For all positive values of x and y, the value of $\frac{(1+x+x^2)(1+y+y^2)}{xy}$

A. ≤ 9

B. < 9

C. ≥ 9

D. > 9

Answer:

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40. How many nine digit numbers can be formed using the digit 2,2,3,3,5,58,8,8, so that the odd digits occupy even positions?

A. 180

B. 7560

C. 60

D. 16

Answer:

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41. There are n points in a plane of which p points are collinear. How many lines can be formed from these points?

A. ${}^{n}C_{2} - {}^{p}C_{2}$

B. ${}^{n}C_{2} - {}^{p}C_{2} + 1$

C. ${}^{n}C_2 - {}^{p}C_2 - 1$

D. ${}^{n-p}C_2$

Answer:

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42. If $f(x) = \begin{vmatrix} \sin x & \cos x & \tan x \\ x^3 & x^2 & x \\ 2x & 1 & x \end{vmatrix}$, then $Lt_{x \to 0} \frac{f(x)}{x^2} =$

A. -1

B. 3

C. 1

D. 0

Answer:

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43. The value of $\int_0^{\pi/2} \log \tan x dx$ is

A. -1

B. $1/2$

C. 0

D. 1

Answer:

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44. The value of $\int_{-1/2}^{1/2} (\cos x)\left[\log\left(\frac{1-x}{1+x}\right)\right] dx$ is

A. $2e^{1/2}$

B. 1

C. $e^{1/2}$

D. 0

Answer:

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45. The area of the figure bounded by the curves y=cosx and y=sinx and the coordinates x=0 and x=$\pi / 4$ is

A. $\sqrt{2}+1$

B. $\sqrt{2}-1$

C. $1 / \sqrt{2}$

D. $\frac{1}{\sqrt{2}}(\sqrt{2}-1)$

Answer:

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46. If $z(2-i)=3+I$, z^{20}=

A. 1-i

B. -1024

C. 1024`

D. $1+i$

Answer:

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47. Let $f(x)=\begin{cases}\frac{\sin\pi x}{5x} & x\neq 0\\ k & x=0\end{cases}$ If f(x) is continuous at x =0, then the value of k is

A. $5/\pi$

B. $\pi/5$

C. 0

D. 1

Answer:

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48. In the set of integers Z, which of the following relation R is not an equivalence relation?

A. xRy: if $x \leq y$

B. xRy: if x=y

C. xRy: if x-y is an even integer

D. xRy: if $x \equiv y$ (mod 3)

Answer:

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49. For how many values of x in the closed interval $[-4, -1]$ the matrix $\begin{bmatrix} 3 & -1+x & 2 \\ 3 & -1 & x+2 \\ x+3 & -1 & 2 \end{bmatrix}$ is singular?

A. 0

B. 2

C. 1

D. 3

Answer:

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50. $G = \left\{ \begin{pmatrix} \cos\theta & \sin\theta \\ -\sin\theta & \cos\theta \end{pmatrix} : \theta \in R \right\}$ is a group under matrix multiplication. then which one of the following statements in respect of G is true?

A. $\begin{pmatrix} -1 & 0 \\ 0 & -1 \end{pmatrix}$ is the inverse of itself

B. G is a finite group

C. $\begin{pmatrix} 1/2 & -\sqrt{3}/2 \\ \sqrt{3}/2 & 1/2 \end{pmatrix}$ is not an element of G

D. $\begin{pmatrix} 1 & 1 \\ -1 & 1 \end{pmatrix}$ is an element of G.

Answer:

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