MATHS

BOOKS - KCET PREVIOUS YEAR PAPERS

SOLVED PAPER 2011

Mathematics

1. If $\frac{\log x}{b-c} = \frac{\log y}{c-a} = \frac{\log z}{a-b}$,then the value of $x^{b+c}.\, y^{c+a}.\, z^{a+b}$ is

A. 1

B. 2

C. 0

D. -1

Answer:

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2. 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. $\frac{n^2-2n}{3}$

B. $\frac{2n^2+n}{3}$

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

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

Answer:

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3. If (n) is an odd positive integer and

$$\left(1+x+x^2+x^3\right)^n=\sum_{r=0}^{3n} a_r x^r$$ then,

$a_0-a_1+a_2-a_3+\ldots-a_{3n}=$

A. 4^n

B. 1

C. -1

D. 0

Answer:

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4. If $r^{th}(r+1)^{th}$ terms in the expansion of $(p+q)^n$ are equal ,then $\frac{(n+1)q}{r(p+q)}$ is

A. 0

B. 1

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

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

Answer:

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5. If α, β and γ are roots of x^3-2x+1=0,then the value of $\Sigma\left(\frac{1}{\alpha+\beta-\gamma}\right)$ is

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

B. -1

C. 0

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

Answer:

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6. Define a relation R on A ={1,2,3,4} as xRy if x divides y.R is

A. Reflexive and transitive

B. Reflexive and symmetric

C. Symmetric and transitive

D. Equivalence

Answer:

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7. The negation of $p \to (\sim p \vee q)$ is

A. $p \vee (p \vee \sim q)$

B. $p \to \sim(p \vee q)$

C. $p \to q$

D. $p \wedge \sim q$

Answer:

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8. $\frac{\cos 2A}{a^2} - \frac{\cos 2B}{b^2} = \frac{1}{a^2} - \frac{1}{b^2}$

A. $a^2 - b^2$

B. $\frac{1}{a^2 - b^2}$

C. $\frac{1}{a^2} - \frac{1}{b^2}$

D. $a^2 + b^2$

Answer:

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9. Angles of elevatiobn of the top of a tower from three points (collinear) A,B and C on a road leading

to the foot of the tower are $30^\circ, 45^\circ$ and 60° respectively .The ratio of AB to BC is

A. $\sqrt{3}:1$

B. $\sqrt{3}:2$

C. $1:2$

D. $2:\sqrt{3}$

Answer:

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10. The value of $\sin 10^\circ . \sin 30^\circ . \sin 50^\circ . \sin 70^\circ$ is

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

B. $\frac{3}{16}$

C. $\frac{\sqrt{3}}{16}$

D. $\frac{1}{16}$

Answer:

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11. Locus of a point which moves such that its distance from the X-axis is twice its distance from the line x-y=0 is

A. $x^2 4xy - y^2 = 0$

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

C. $X^2 - 4xy + y^2 = 0$

D. $x^2 - 4xy - y^2 = 0$

Answer:

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12. The points A(1,2),B(2,4) and C(4,8) form a/an

A. isosceles triangle

B. equilateral triangel

C. Straight line

D. Right angled triangle

Answer:

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13. If line represented by x+3y-6=,2x+y-4=0 abd kx-3y+1=0 are concurrent ,then the value of k is

A. $\frac{6}{19}$

B. $\frac{19}{6}$

C. $\frac{-19}{6}$

D. $\frac{-6}{19}$

Answer:

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

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

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

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

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

Answer:

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15. If $f(x) = \begin{cases} \frac{\log_e x}{x-1} & x \neq 1 \\ k & x = 1 \end{cases}$ is continuous at x = 1 , then the value of k is

A. 0

B. -1

C. 1

D. e

Answer:

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16. If $A = \begin{bmatrix} \cos\theta & \sin\theta \\ -\sin\theta & \cos\theta \end{bmatrix}$, then $A.\ A'$ is

A. I

B. A

C. $-A$

D. A^2

Answer:

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17. If $\begin{bmatrix} 1 & 2 & -1 \\ 1 & x-2 & 1 \\ x & 1 & 1 \end{bmatrix}$ is singular ,then the value of x is

A. 2

B. 3

C. 1

D. 0

Answer:

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18. If A and B ar symmetric matrics of the same order ,then which one of the following Is NOT true?

A. A+B is symmetric

B. A-B is symmetric

C. AB+BA is symmetric

D. AB-BA is symmetric

Answer:

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19. If ω is an imaginary cube root of unity ,then the value of $\begin{bmatrix} 1 & \omega^2 & 1-\omega^4 \\ \omega & 1 & 1+\omega^5 \\ 1 & \omega & \omega^2 \end{bmatrix}$ is

A. -4

B. $\omega^2 - 4$

C. ω^2

D. 4

Answer:

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20. If $\vec{a}, \vec{b}$ and $\vec{c}$ are unit vectors such that $\vec{a} + \vec{b} + \vec{c} = \vec{0}$ then angle between $\vec{a}$ and $\vec{b}$ is

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

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

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

D. π

Answer:

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21. If $\vec{a}$, $\vec{b}$ and $\vec{c}$ are non-coplaner,then value of

$$\vec{a}\left\{\frac{\vec{b}\times\vec{c}}{3\vec{b}.\left(\vec{c}\times\vec{a}\right)}\right\}-\vec{b}.\left\{\frac{\vec{c}\times\vec{a}}{2\vec{c}.\left(\vec{a}\times\vec{b}\right)}\right\}$$

is

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

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

C. $\frac{-1}{6}$

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

Answer:

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22. If $2\hat{i}+3\hat{j}$, $\hat{i}+\hat{j}+\hat{k}$ and $\lambda\hat{i}+4\hat{j}+2\hat{k}$ taken in an order are coterminous edges of a parallelopoped of volume 2 cu units,then value of λ is

A. -4

B. 2

C. 3

D. 4

Answer:

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23. A unit vector perpendicular to both $\hat{i}+\hat{j}+\hat{k}$ and $2\hat{i}+\hat{j}+3\hat{k}$ is

A. $\left(2\hat{i}-\hat{j}-\hat{k}\right)\sqrt{6}$

B. $\dfrac{2\hat{i}-\hat{j}-\hat{k}}{\sqrt{6}}$

C. $2\hat{i}+\hat{j}+\hat{k}$

D. $\dfrac{3\hat{i}+\hat{j}-2\hat{k}}{\sqrt{6}}$

Answer:

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24. The digit in the unit's place of 7^{171} + (177)! Is

A. 3

B. 2

C. 1

D. 0

Answer:

25. The sum of all positive divisors of 242 except 1 and self is

A. 156

B. 242

C. 342

D. 399

Answer:

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26. On the set on all non-zero reals,an operation * is defined as $a \cdot b = \frac{3ab}{2}$ .In this group ,a solution of $(2 \cdot x) \cdot 3^{-1} = 4^{-1}$ is

A. 6

B. 1

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

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

Answer:

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27. If $2x^2 + 2y^2$+4x+5y+1=0 and $3x^2 + 3y^2 + 6x$ -7y+3k=0 are orthogonal ,then value of k is

A. $\frac{17}{12}$

B. $\frac{12}{17}$

C. $\frac{-12}{17}$

D. $\frac{-17}{12}$

Answer:

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28. The total number of common tangentss of

$x^2 + y^2$-6x-8y+9=0 and $x^2 + y^2 = 1$ is

A. 4

B. 2

C. 3

D. 1

Answer:

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29. The length of the latus rectum of

$3x^2 - 4y + 6x - 3 = 0$ is

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

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

C. 2

D. 3

Answer:

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30. The sum of the reciprocals of focal distances of a focal chord PQ of y^2=4ax is

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

B. a

C. 2a

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

Answer:

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31. If the focii of $\frac{x^2}{16}+\frac{y^2}{4}=1$ and $\frac{x^2}{a^2}-\frac{y^2}{3}$=1 coincide, then value of a is

A. $\sqrt{3}$

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

C. 2

D. 3

Answer:

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32. The equation of a hyperbola whose asymtotes are 3x $\pm$ 5y=0 and vertices are $(\pm 5, 0)$ is

A. $3x^2 - 5y^2$=25

B. $5x^2 - 3y^2 = 225$

C. $25x^2 - 9y^2 = 225$

D. $9x^2 - 25y^2 = 225$

Answer:

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33. The domain of f(x) $\sin^{-1}\left(\frac{\log_2(x)}{2}\right)$ is

A. $0 \leq x \leq 1$

B. $0 \leq x \leq 4$

C. $1 \leq x \leq 4$

D. $4 \leq x \leq 6$

Answer:

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34. If $\tan^{-1} x = \frac{\pi}{4} - \tan^{-1}\left(\frac{1}{3}\right)$, then x is

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

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

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

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

Answer:

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35. A value of θ satisfying $\sin 5\theta - \sin 3\theta + \sin \theta = 0$ such that $0 < \theta < \frac{\pi}{2}$ is

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

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

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

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

Answer:

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36. The value of $\left|\frac{1+i\sqrt{3}}{\left(1+\frac{1}{i+1}\right)^2}\right| =$

A. 20

B. 9

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

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

Answer:

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37. If ω is an imaginary cube root of unity ,then the value of $(1-\omega+\omega^2).(1-\omega^2+\omega^4).(1-\omega^4+\omega^8)$..... (2n factors) is

A. 2^{2n}

B. 2^n

C. 1

D. 0

Answer:

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38. If P(x, y) denotes $z = x + iy$ in Argand's plane and $\left|\frac{z-1}{z+2i}\right| = 1$, then the locus of P is/an

A. hyperbola

B. ellipse

C. circle

D. straight line

Answer:

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39. If $\sqrt{r} = ae^{\theta \cot \alpha}$ where a and α are real numbers then $\frac{d^2r}{d\theta^2} - 4r\cot^2\alpha$ is

A. r

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

C. 1

D. 0

Answer:

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40. The derivative of $\tan^{-1}\left[\frac{\sin x}{1+\cos x}\right]$ with respect to $\tan^{-1}\left[\frac{\cos x}{1+\cos x}\right]$ is

A. 2

B. -1

C. 0

D. -2

Answer:

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41. $\frac{d}{dx}\left[\cos^2\left(\cos^{-1}\sqrt{\frac{2+x}{2-x}}\right)\right]$ is

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

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

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

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

Answer:

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42. $f(x) = \dfrac{\sin^2 x}{1+\cot x} + \dfrac{\cos^2 x}{1+\tan x}$,then ,$\left(\dfrac{\pi}{4}\right)$ is

A. $\sqrt{3}$

B. $\dfrac{1}{\sqrt{3}}$

C. 0

D. $-\sqrt{3}$

Answer:

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43. If $\cos^{-1}\left(\frac{y}{b}\right) = n\log\left(\frac{x}{n}\right)$, then

A. $xy_1 = n\sqrt{b^2 - y^2}$

B. $xy_1 + n\sqrt{b^2 - y^2} = 0$

C. $y_1 = x\sqrt{b^2 - y^2}$

D. $xy_1 - \sqrt{b^2 - y^2} = 0$

Answer:

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44. Area of a triangle formed by tangent and normal to the curve $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ at P $\left(\frac{a}{\sqrt{2}},\frac{b}{\sqrt{2}}\right)$ with the X-axis is

A. 4ab

B. $\frac{ab\sqrt{a^2+b^2}}{4}$

C. $\frac{ab\sqrt{a^2-b^2}}{4}$

D. $\frac{b\left(a^2+b^2\right)}{4a}$

Answer:

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45. The angle between $y^2 = 4x$ and $x^2 + y^2 = 12$ at a point of their intersection is

A. $\tan^{-1}\sqrt{2}$

B. $\tan^{-1} 2$

C. $\tan^{-1} 2\sqrt{2}$

D. $\tan^{-1}\left(\frac{1}{2}\right)$

Answer:

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46. A sphere increases its volume at the rate of π / s . The rate at which its surface area increases when the radius is 1 cm is

A. 2π sq. cm/s

B. $\pi sq.$ cm/s

C. $\frac{3\pi}{2}$ sq. cm/s

D. $\frac{\pi}{2}$ sq. cm/s

Answer:

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47. The value of $\int_0^4 |x-1|\,dx$ is

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

B. 5

C. 4

D. 1

Answer:

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48. If $I_n \int_0^{\pi/4} \tan^n x \, dx$, where n is a positive interger, then $I_{10} + I_8$ is

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

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

C. $\frac{1}{7}$

D. 9

Answer:

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49. $\int e^x \left[\frac{\sin x + \cos x}{1 - \sin^2 x}\right] dx$ is

A. $\left(\frac{e^x}{\cos e} cx\right) + c$

B. $e^x \cot x + c$

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

D. $e^x \tan x + c$

Answer:

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50. When $x > 0$, then $\int \cos^{-1}\left(\frac{1 - x^2}{1 + x^2}\right) dx$ is

A. $2\left[x\tan^{-1}x-\log\left(1+x^2\right)\right]+c$

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

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

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

Answer:

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51. If the area between $y=mx^2$ and $x=my^2$ (m > 0) is $\frac{1}{4}$ sq. unit, then the value of m is :

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

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

C. $\sqrt{2}$

D. $\sqrt{3}$

Answer:

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52. If m and n are degree and other of $\left(1+y_1^2\right)^{2/3}=y_2$, then tha value of $\frac{m+n}{m-n}$ is

A. 3

B. 4

C. 5

D. 2

Answer:

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53. The genral solution of $\frac{dy}{dx} = \sqrt{1 - x^2 - y^2 + x^2y^2}$ is

A. $2\sin^{-1} y = x\sqrt{1 - x^2} + \sin^{-1} x + c$

B. $\cos^{-1} y = x\cos^{-1} x + c$

C. $\sin^{-1} y = \frac{1}{2}\sin^{-1} x + c$

D. $2\sin^{-1} y = x\sqrt{1-y^2} + c$

Answer:

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54. If $x\cos\alpha + y\sin\alpha = 4$ is tangent to $\frac{x^2}{25} + \frac{y^2}{9} = 1$ then the value of α is

A. $\tan^{-1}(3/7)$

B. $\tan^{-1}(\sqrt{3}/7)$

C. $\tan^{-1}(7/3)$

D. $\tan^{-1}(3/\sqrt{7})$

Answer:

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55. If P is point on $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ with focii S and S' then the maximum value of triangle SPS' is

A. ab

B. abe^2

C. abe

D. ab/e

Answer:

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56. In Argand's plane ,the point corresponding to $\frac{\left(1-i\sqrt{3}\right)(1+i)}{\sqrt{3}+i}$ lies in

A. quadrant I

B. quadrant II

C. quadrant III

D. quadrant IV

Answer: D

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57. If y =sinx.sin2x.sin3x..... Sinnx,then y' is

A. $y \sum_{k=1}^{n} k$ tankx

B. $y \sum_{k=1}^{n} k$ cotkx

C. $y \sum_{k=1}^{n} k$ tankn

D. $y \sum_{k=1}^{n}$ cotkx

Answer:

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58. $\begin{bmatrix} \sin\alpha & \cos\alpha & \sin(\alpha+\delta) \\ \sin\beta & \cos\beta & \sin(\beta+\delta) \\ \sin\gamma & \cos\gamma & \sin(\gamma+\delta) \end{bmatrix} =$

A. 0

B. 1

C. $1+\sin\alpha\sin\beta\sin\gamma$

D.

$$1-(\sin\alpha-\sin\beta)(\sin\beta-\sin\gamma)(\sin\gamma-\sin\alpha)$$

Answer:

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