MATHS

BOOKS - KCET PREVIOUS YEAR PAPERS

KARNATAKA CET 2001

Mathematics

1. If $A = \begin{bmatrix} 2 & 3 \\ 4 & 6 \end{bmatrix}$, then $A^{-1} =$

A. $\begin{bmatrix} 2 & -3 \\ 4 & 6 \end{bmatrix}$

B. $\begin{bmatrix} 1 & 2 \\ -3/2 & 3 \end{bmatrix}$

C. Does not exist

D. $\begin{bmatrix} -2 & 4 \\ -3 & 6 \end{bmatrix}$

Answer:

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2. The Area of the Parallelogram determined by the vectors $\hat{i} + 2\hat{j} + 3\hat{k}, \ -3\hat{i} - 2\hat{j} + \hat{k}$ (in sq. unit) is

A. $\sqrt{190}$

B. $\sqrt{180}$

C. $\sqrt{40}$

D. 2

Answer:

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3. Ley (G,) be a group. If $(a.\ b)^2 = a^2.\ b^2$ for all $a, b \in G$. Then G is

A. semi group

B. may or may not be abelian

C. non-abelian

D. abelian

Answer:

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4. If the vecotrs $a\hat{i} + \hat{j} - 2\hat{k}$ and $-12\hat{i} + 4\hat{j} + 8\hat{k}$ are perpendicular then the value of a is equal to

A. -1

B. 12

C. -3

D. 3

Answer:

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5. The unit vector perpendicular to the vectors $\hat{i}-\hat{j}+\hat{k}, 2\hat{i}+3\hat{j}-\hat{k}$ is

A. $\frac{-2\hat{i}+5\hat{j}+6\hat{k}}{\sqrt{38}}$

B. $\frac{-2\hat{i}+3\hat{j}+5\hat{k}}{\sqrt{30}}$

C. $\frac{-2\hat{i}+4\hat{j}+5\hat{k}}{\sqrt{38}}$

D. $\frac{-2\hat{i}+3\hat{j}+5\hat{k}}{\sqrt{38}}$

Answer:

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6. If $\vec{a} = 3\vec{i} - 2\vec{j} + 2\vec{i}$, $\vec{b} = 6\vec{i} + 4\vec{j} - 2\vec{k}$, $\vec{c} = 3\hat{i} - 2\hat{j} - 4\hat{k}$, Then $\vec{a}.\left(\vec{b} \times \vec{c}\right)$ is

A. 118

B. 122

C. -120

D. -144

Answer:

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7. The modulus and amplitude of $\frac{1+i}{1-i}$ are

A. $\sqrt{2}, \pi/3$

B. $1, \pi/4$

C. $-1, \ -\pi/2$

D. $1, \pi/2$

Answer:

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8. $1, \omega, \omega^2$ are cube roots of unit x, then their product is

A. ω

B. 0

C. 1

D. -1

Answer:

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9. In the argand diagram the points representing the complex numbers $7+9i, 3-7i$ and $-3+3i$

A. form the vertices of an isosceles triangle

B. form the verticies of a right angled isosceles triangle

C. are collinear

D. form the vertices of an equilateral triangle

Answer:

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10. Equations of the separate lines of the pair of lines whose equation is $x^2 + xy - 12y^2 = 0$ are given by

A. $2x - 3y = 0$ and $x - 4y = 0$

B. $x + 4y = 0$ and $x + 3y = 0$

C. $x + 4y = 0$ and $x - 3y = 0$

D. $x - 6y = 0$ and $x - 3y = 0$

Answer:

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11. The angle between the lines $x^2 + 4xy + y^2 = 0$ is

A. 15°

B. 60°

C. 45°

D. 30°

Answer:

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12. The two circles $x^2 + y^2 - 2x + 6y + 6 = 0$ and $x^2 + y^2 - 5x + 6y + 15 = 0$

A. touch extenally

B. intersect

C. are concentric

D. touch internally

Answer:

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13. The vertex of the parabola $(y-2)^2 = 16(x-1)$ is

A. $(1, -2)$

B. (2,1)

C. (1,2)

D. $(-1, 2)$

Answer:

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14. Equation of the parabola with its vertex at (1,1) and focus (3,1) is

A. $(y-1)^2 = 8(x-3)$

B. $(x-1)^2 = 8(y-1)$

C. $(x-3)^2 = 8(y-1)$

D. $(y-1)^2 = 8(x-1)$

Answer:

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15. Equation of the tangent at $(-4, -4)$ on $x^2 = -4y$ is

A. $2x - y - 12 = 0$

B. $2x + y + 4 = 0$

C. $2x - y + 4 = 0$

D. $2x + y - 4 = 0$

Answer:

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16. The distance between the foci is 16, eceentricity $= 1/2$, the length of the major axis of the ellipse is

A. 62

B. 8

C. 32

D. 16

Answer:

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17. The abscissae of the points where the tangent to curve $y = x^3 - 3x^2 - 9x + 5$ is parallel to x axis are

A. x=1, -1

B. 0

C. $x = -1, 3$

D. $x = 1, -3$

Answer:

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18. The function $f(x) = 2x^3 - 15x^2 + 36x + 4$ is maximum at

A. x=4

B. x=2

C. x=3

D. x=0

Answer:

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19. The value of the $\int \frac{1}{(x-5)^2 dx}$ is

A. $\frac{2}{(x-5)^3 + c}$

B. $-2(x-5)^3 + c$

C. $\frac{1}{x-5} + c$

D. $-\frac{1}{x-5} + c$

Answer:

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20. The value of the $\int \frac{2dx}{\sqrt{1-4x^2}}$ is

A. $\cot^{-1}(2x)+c$

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

C. $\sin^{-1}(2x)+c$

D. $\cos^{-1}(2x)+c$

Answer:

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21. The order and degree of the differential equation $x\frac{d^2y}{dx^2}+\left(\frac{dy}{dx}\right)^2+y^2=0$ are respectively

A. 1 and 1

B. 2 and 2

C. 1 and 2

D. 2 and 1

Answer:

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22. Let p be the proposition. Mathematics is interesting and let q be the proposition mathematics is difficult, then the symbol $p \cap q$ means

A. mathematics is interesting implies and is implied by mathematics is difficult

B. mathematic is intersting implies mathematics is diffult

C. mathematics is interesting or mathematics is difficult

D. mathematics is interesting and mathematics is difficult

Answer: D

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23. If a clock strikes the appropriate number of times at each hour, then the number of times it will strike in a day is

A. 24

B. 180

C. 156

D. 78

Answer:

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24. If A and B are two points of a circle of radius r with centre at the point O and $\angle AOB = \theta$ (in radians) then the area of the sector AOB is

A. $\frac{1}{2}r^2\theta$

B. $r\theta$

C. $2\pi r$

D. πr^2

Answer:

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25. The point at which the tangent to the curve $y = 2x^2 - x + 1$ is parallel to $y = 3x + 9$ is

A. $(1, 2)$

B. (2,1)

C. $(-2, 1)$

D. (3,9)

Answer:

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

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

B. ∞

C. 1

D. 0

Answer:

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27. The sum of the series $\frac{2}{3}+\frac{8}{9}+\frac{26}{27}+\frac{80}{81}+\ldots$to n terms is

A. $n+\frac{1}{2}(3^n-1)$

B. $n-\frac{1}{2}(3^n-1)$

C. $n-\frac{1}{2}\left(3^{-n}-1\right)$

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

Answer:

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28. If $\cos\theta = \frac{-1}{2}$ and $0 < \theta < 360^\circ$, then solutions are

A. $120^\circ, 210^\circ$

B. $\theta = 120^\circ, 300^\circ$

C. $\theta = 60^\circ, 240^\circ$

D. $\theta = 120^\circ, 240^\circ$

Answer:

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29. A value of x satisfying $5x \equiv +3 \pmod 7$ is

A. 5

B. 0

C. 4

D. 3

Answer:

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30. Let P be a point represented by the complex number Z. Rotate OP (O is the origin) through $\pi/2$ in the anti clockwise direction, the new position of the complex number is represented by

A. $Z - i$

B. Z/i

C. $Z + i$

D. iZ

Answer:

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31. The radical axis of the two circleS and the line of centres of those circleS are

A. intersecting, but not fully perpendicular

B. neither parallel, nor perpendicular

C. perpendicular

D. parallel

Answer:

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32. The value of $\lim_{x \to 0} \left[\frac{\sqrt{a+x} - \sqrt{a-x}}{x} \right]$ is

A. 0

B. 1

C. $\sqrt{a}$

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

Answer:

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33. The equation of the lines through the origin and perpendicular to the lines $ax^2 + 2hxy + bh^2 = 0$ is

A. $hx^2 - 2bxy + ay^2 = 0$

B. $bx^2 - 2hxy + ay^2 = 0$

C. $ax^2 - 2hxy + by^2 = 0$

D. $bx^2 - 2hxy + by^2 = 0$

Answer:

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34. The conjugate of $\frac{(2+i)^2}{3+i}$ in the form of $a+ib$ is

A. $\frac{13}{10}+i\left(\frac{-15}{2}\right)$

B. $\frac{13}{2}+i\left(\frac{15}{2}\right)$

C. $\frac{13}{10}+i\left(\frac{9}{10}\right)$

D. $\frac{13}{10}+i\left(\frac{-9}{10}\right)$

Answer:

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35. The equation $12x^2 + 7xy + \alpha y^2 + 13x - y + 3 = 0$ represents a pair of perpendicular lines. Then the value of α is

A. -19

B. $7/2$

C. 12

D. -12

Answer:

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36. The length of transverse axis of the hyperbola $3x^2 - 4y^2 = 32$ is

A. $\frac{16\sqrt{2}}{\sqrt{3}}$

B. $\frac{8\sqrt{2}}{\sqrt{3}}$

C. 64/3

D. 11749

Answer:

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37. The angle between the curves $y^2 = x$ and $x^2 = y$ at (1,1) is

A. $\tan^{-1}(4/5)$

B. $\tan^{-1}(3/4)$

C. $\tan^{-1}(4/3)$

D. $\tan(4/3)$

Answer:

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38. In a group G a,b,c,d $\in G$, Then $(abc)^{-1}$ is

A. $b^{-1}c^{-1}d$

B. $c^{-1}b^{-1}a^{-1}$

C. $b^{-1}c^{-1}a^{-1}$

D. $c^{-1}b^{-1}c^{-1}$

Answer:

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39. If A and B are square matrices of the same order, then show that $(AB)^{-1} = B^{-1}A^{-1}$.

A. $A^{-1}B$

B. AB^{-1}

C. $B^{-1}A^{-1}$

D. $A^{-1}B^{-1}$

Answer:

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40. The value of $\begin{vmatrix} 41 & 42 & 43 \\ 44 & 45 & 46 \\ 47 & 48 & 49 \end{vmatrix}$ is

A. 4

B. 2

C. 1

D. 0

Answer:

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41. If $a\hat{i} + 6\hat{j} - \hat{k}$ and $7\hat{i} - 3\hat{j} + 17\hat{k}$ are perpendicular vectors, then the value of a= ....

A. $1/7$

B. 5

C. -5

D. 7

Answer:

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42. The circle $x^2 + y^2 - 3x - 4y + 2 = 0$ cuts the x axis at the points

A. (3,0)(4,0)

B. (2,0) $(-3, 0)$

C. (1,0), (2,0)

D. (1,0), $(-1, 0)$

Answer:

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43. A line makes zero intersects on x axis and y axis and it is prependicular to the line $3x + 4y + 6 = 0$ then its equation is

A. $4x - 3y + 8 = 0$

B. $4x - 3y + 6 = 0$

C. $y = x$

D. $4x - 3y = 0$

Answer:

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44. If ${}^{n}P_{4} = 24{}^{n}C_{5}$ then the value of n=

A. 15

B. 10

C. 5

D. 9

Answer:

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45. In the expansion of $\left(x - \frac{3}{x^2}\right)^9$, the term independent of x is

A. ${}^9C_2$

B. 2268

C. -2268

D. non existent

Answer:

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46. The sixth term of a H.P is 1/61 and the 10^{th} term is 1/105.then the first term of that H.P is

A. $1/39$

B. $1/28$

C. $1/17$

D. $1/6$

Answer:

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47. The value of $\lim_{x \to 0} \left(\frac{e^x - 1}{x} \right)$ is

A. ∞

B. $1/2$

C. 0

D. 1

Answer:

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48. The remainder in the division of 2^{50} by 7is

A. 2

B. 0

C. 1

D. 4

Answer:

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49. a,g,h are arithmetic mean, geometric mean and harmonic mean between two positive number x and y respectively. Then identify the correct statement among the following

A. no such relation exists between a,g and h

B. h is the harmonic mean between a and g

C. a is the arithmetic mean between g and h

D. g is the geometric mean between a and h

Answer:

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50. The value of $\left(\tan^{-1}\left(\frac{1}{2}\right)+\tan^{-1}\left(\frac{1}{3}\right)\right)=$

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

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

C. $\tan^{-1}\left(\frac{5}{6}\right)$

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

Answer:

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51. The length of altitude through A of the triangle ABC where $A \equiv (-3, 0), B \equiv (4, -1) C \equiv (5, 2)$ is

A. $\frac{4}{\sqrt{10}}$

B. $\frac{2}{\sqrt{10}}$

C. $\frac{22}{\sqrt{10}}$

D. $\frac{11}{\sqrt{10}}$

Answer:

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52. In a railway compartment there are 6 seats. The number of ways in which 6 passengers can occupy those seats= ...

A. 30

B. 36

C. 120

D. 720

Answer:

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53. $\frac{d}{dx}\left[\tan^{-1}\left(\frac{a-x}{1+ax}\right)\right]$ is

A. $\frac{-1}{\sqrt{1-\left(\frac{a-x}{1+ax}\right)^2}}$

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

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

D. $\frac{1}{1+\left(\frac{a-x}{1+ax}\right)^2}$

Answer:

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