MATHS

BOOKS - MTG MATHS (BENGALI ENGLISH)

QUESTION PAPER 2018

Multiple Choice Questions

1. If $(2 \leq r \leq n)$. then ${}^{n}C_{r} + 2.\ {}^{n}C_{r+2}$ is equal to

A. $2^{n}C_{r+2}$

B. ${}^{n+1}C_{r+1}$

C. ${}^{n+2}C_{r+2}$

D. ${}^{n+1}C_r$

Answer:

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2. The number $(101)^{100} - 1$ is divisible by

A. 10^4

B. 10^6

C. 10^8

D. 10^{12}

Answer:

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3. If n is even positive integer, then the condition that the greatest term in the expansion of $(1+x)^n$ may also have the greatest coefficient is

A. $\frac{n}{n+2} < x < \frac{n+2}{n}$

B. $\frac{n}{n+1} < x < \frac{n+1}{n}$

C. $\frac{n+1}{n+2} < x < \frac{n+2}{n+1}$

D. $\frac{n+2}{n+3} < x < \frac{n+3}{n+2}$

Answer:

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4. If $\begin{vmatrix} -1 & 7 & 0 \\ 2 & 1 & -3 \\ 3 & 4 & 1 \end{vmatrix} = A$. Then $\begin{vmatrix} 13 & -11 & 5 \\ -7 & -1 & 25 \\ -21 & -3 & -15 \end{vmatrix}$ is

(I_3 denotes the det of the identity matrix of order 3)

A. A^2

B. $A^2 - A + I_3$

C. $A^2 - 3A - I_3$

D. $3A^2 - 5A - 4I_3$

Answer:

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5. If $a_r = (\cos 2r\pi + i\sin 2r\pi)^{\frac{1}{9}}$. Then the value of $\begin{vmatrix} a_1 & a_2 & a_3 \\ a_4 & a_5 & a_6 \\ a_7 & a_8 & a_9 \end{vmatrix}$ is

A. 1

B. -1

C. 0

D. 2

Answer:

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6. if $S_r = \begin{vmatrix} 2r & x & n(n+1) \\ 6r^2 - 1 & y & n^2(2n+3) \\ 4r^2 - 2nr & z & n^3(n+1) \end{vmatrix}$. Then the value of

$$\sum_{1}^{n} S_r$$

is independent of

A. x only

B. y only

C. n only

D. x,y,z and n

Answer:

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7. If the following three linear equations have a non-trivial solution, then

$x + 4ay + az = 0$

$x + 3by + bz = 0$

$x + 2cy + cz = 0$

A. a, b, c are in A.P

B. a, b, c are in G.P

C. a, b, c are in H.P

D. $a + b + c = 0$

Answer:

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8. On In a relation ρ is defined by $x \rho y$ if and only if $x - y$ is zero or irrational. Then

A. ρ is equivalence relation

B. ρ is reflexive but neither symmetric nor transitive

C. ρ is reflexive & symmetric but not transitive

D. ρ is symmetric & transitive but not reflexive

Answer:

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9. On the set R of real numbers, the relation ρ is defined by

$x\rho y, (x, y) \in R.$

A. If $|x - y| < 2$ then ρ is reflexive but neither symmetric nor transitive

B. If $x - y < 2$ then ρ is reflexive and symmetric but not transitive

C. If $|x| \geq y$ then ρ is reflexive and transitive but not symmetric

D. If $x > |y|$ then ρ is transitive but neither reflexive nor symmetric.

Answer:

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10. If $f: R \to R$ be defined by $f(x) = e^x$ and $g: R \to R$ be defined by $g(x) = x^2$. The mapping gof : $R \to R$ be defined by (g o f) $(x) = g[f(x)] Ax \in R$. Then

A. g o f is bijective but f is not injective

B. g o f is injective and g is injective

C. g o f is injective but g is not bijective

D. g o f is surjective and g is surjective

Answer:

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11. In order to get a head at least once with probility ≥ 0.9. The minimum number of times a unbiased coin needs to be tossed is

A. 3

B. 4

C. 5

D. 6

Answer:

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12. A student appears for test I, II and III. The student is successful if he passes in tests I, II or I, III. The probabilities of the student passing in tests I, II and III are respectively p, q and $\frac{1}{2}$. If the probability of the student to be successful is $\frac{1}{2}$. Then

A. $p(1+q)=1$

B. $p(1+p)=1$

C. $pq=1$

D. $\frac{1}{p}+\frac{1}{q}=1$

Answer:

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13. If $\sin 6\theta + \sin 4\theta + \sin 2\theta = 0$, then general value of θ is (n is integer)

A. $\frac{n\pi}{4}, n\pi \pm \frac{\pi}{3}$

B. $\frac{n\pi}{4}, n\pi \pm \frac{\pi}{6}$

C. $\frac{n\pi}{4}, 2n\pi \pm \frac{\pi}{3}$

D. $\frac{n\pi}{4}, 2n\pi \pm \frac{\pi}{6}$

Answer:

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14. If $0 \leq A \leq \frac{\pi}{4}$, then $\tan^{-1}\left(\frac{1}{2}\tan 2A\right) + \tan^{-1}(\cot A) + \tan^{-1}\left(\cot^3 A\right)$ is equal to

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

B. π

C. 0

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

Answer:

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15. Without changing the direction of the axes, the origin is transferred to the point (2, 3). Then the equation $x^2 - y^2 - 4x - 6y + 9 = 0$ changes to

A. $x^2 + y^2 + 4 = 0$

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

C. $x^2 + y^2 - 8x - 12y + 48 = 0$

D. $x^2 + y^2 = 9$

Answer:

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16. The angle between a pair of tangents drawn from a point P to the circle $x^2 + y^2 + 4x - 6y - 9\sin^2\alpha - 13\cos^2\alpha = 0$ is 2α. The equation of the locus of the point P is

A. $x^2 + y^2 + 4x + 6y - 9 = 0$

B. $x^2 - y^2 - 4x + 6y - 9 = 0$

C. $x^2 - y^2 - 4x - 6y - 9 = 0$

D. $x^2 + y^2 + 4x - 6y + 9 = 0$

Answer:

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17. The point Q is the image of the point P(1,5) about the line y=x and R is the image of the point Q about the line $y = -x$. The circumcenter of the ΔPQR is

A. (5, 1)

B. $(-5, 1)$

C. $(1, -5)$

D. (0, 0)

Answer:

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18. The angular points of a triangle are $A(-1, -7), B(5, 1)$ and $C(1, 4)$. The equation of the bisector of the angle $\angle ABC$ is

A. $x = 7y - 2$

B. $7y = x - 2$

C. $y = 7x - 2$

D. $7x = y + 2$

Answer:

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19. If one of the diameters f the circle, given by the equation $x^2 + y^2 - 4x + 6y - 12 = 0$ is a chord of a circle S, whose centre is $(-3, 2)$, the radius of S is

A. 10 unit

B. 5 unit

C. $5\sqrt{2}$ unit

D. $5\sqrt{3}$ unit

Answer:

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20. A chord AB is drawn from the point A(0, 3) on the circle $x^2 + 4x + (y-3)^2 = 0$ and is extended to M such that AM= 2AB. The locus of M is

A. $x^2 + y^2 - 8x - 6y + 9 = 0$

B. $x^2 + y^2 + 8x + 6y - 9 = 0$

C. $x^2 + y^2 + 8x - 6y + 9 = 0$

D. $x^2 + y^2 - 8x - 6y + 9 = 0$

Answer:

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21. Let the occentricity of the hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ be reciprocal to that of the ellipse $x^2 + 9y^2 = 9$, then the ratio $a^2 : b^2$ equals

A. $8 : 1$

B. $1 : 8$

C. $9 : 1$

D. $1 : 9$

Answer:

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22. Let A. B be two distinct points on the parabola $y^2 = 4x$. If the axis of the parabola touches a circle of radius r having AB as diameter, the slope of the line AB is

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

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

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

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

Answer:

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23. Let $P(at^2, 2at)$, Q, $R(ar^2.2ar)$ be three points on a parabola $y^2 = 4ax$. If PQ is the focal chord and PK. QR are parallel where the co-ordinates of K is (2a, 0), then the value of r is

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

B. $\frac{1-t^2}{t}$

C. $\frac{t^2+1}{t}$

D. $\frac{t^2-1}{t}$

Answer:

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24. Let P be a point on the ellipse $\frac{x^2}{9} + \frac{y^2}{4} = 1$ and the line through P parallel to the y-axis meets the circle $x^2 + y^2 = 9$ at Q, where P, Q are on the same side of the x-axis. If R is a point on PQ such that $\frac{PR}{RQ} = \frac{1}{2}$, then the locus of R is

A. $\frac{x^2}{9} + \frac{9y^2}{49} = 1$

B. $\frac{x^2}{49} + \frac{y^2}{9} = 1$

C. $\frac{x^2}{9} + \frac{y^2}{49} = 1$

D. $\frac{9x^2}{49} + \frac{y^2}{9} =$

Answer:

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25. A point P lies on a line through $Q(1, -2, 3)$ and is parallel to the line $\frac{x}{1} = \frac{y}{4} = \frac{z}{5}$. If P lies on the plane $2x + 3y - 4z + 22 = 0$, then segment PQ equals to

A. $\sqrt{42}$ units

B. $\sqrt{32}$ units

C. 4 units

D. 5 units

Answer:

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26. The foot of the perpendicular drawn from the point (1, 8,4) on the line joining the points

$(0, -11, 4)$ and $(2, -3, 1)$ is

A. (4, 5,2)

B. $(-4, 5, 2)$

C. $(4, -5, 2)$

D. $(4, 5, -2)$

Answer:

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27. The approximate value of $\sin 31^\circ$ is

A. > 0.5

B. > 0.6

C. < 0.5

D. < 0.4

Answer:

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28. Let

$f_1(x) = e^x, f_2(x) = e^{f_1(x)}, \ldots\ldots f_{n+1}(x) = e^{f_n(x)}$ for all $n \geq 1$. The for any fixed n. $\frac{d}{dx} f_n(x)$ is

A. $f_n(x)$

B. $f_n(x) f_{n-1}(x)$

C. $f_n(x) f_{n-1}(x) \ldots . f_1(x)$

D. $f_n(x) \ldots . f_1(x) e^x$

Answer:

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29. The domain of definition of $f(x) = \sqrt{\frac{1 - |x|}{2 - |x|}}$ is

Here

$(a, b) = \equiv |x : a < x < b| \;\; \& \;\; [a, b] \equiv |x : a \leq x \leq b|$

A. $(-\infty, -1) \cup (2, \infty)$

B. $[-1, 1] \cup (2, \infty) \cup (\infty, -2)$

C. $(-\infty, 1) \cup (2, \infty)$

D. $[-1, 1] \cup (2, \infty)$

Answer:

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30. Let $f:[a,b]\to R$ be differentiable on [a, b] & $k\in R$. Let $f(a)=0f(b)$. Also let $J(x)=f'(x)-kf(x)$. Then

A. $J(x)>0$ for all $x\in[a,b]$

B. $J(x)<0$ for all $x\in[a,b]$

C. J(x)= 0 has at least one root in (a,b)

D. J(x)= 0 through (a,b)

Answer:

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31. Let $f(x) = 3x^{10} - 7x^8 + 5x^6 - 21x^3 + 3x^2 - 7$. Then

$$\lim_{h \to 0} \frac{f(1-h) - f(1)}{h^3 + 3h}$$

A. does not exist

B. is $\frac{50}{3}$

C. is $\frac{53}{3}$

D. is $\frac{22}{3}$

Answer:

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32. Let $f : [a, b] \to R$ be such that f is differentiable in (a,b). f is continuous at x=a & x= b and moreover f(a)= 0=

f(b). Then

A. there exists at least one point c in (a,b) such that f'(c

)= f(c)

B. f'(x)= f(x) does not hold at any point in(a,b)

C. at every point of (a, b), $f'(x) > f(x)$

D. at everypoint of (a, b), $f'(x) < f(x)$

Answer:

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33. Let $f: R \to R$ be a twice continuously differentiable

function such that f(0)= f(1)= f'(0)= 0. Then

A. f''(0)= 0

B. f''(c)= 0 for some $c \in R$

C. if $c \neq 0$, then $f''(c) \neq 0$

D. $f'(x) > 0$ for all $x \neq 0$

Answer:

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34. If $\int e^{\sin x}\left[\frac{x \cos^3 x - \sin x}{\cos^2 x}\right] dx = e^{\sin x} . f(x) + c.$

Where c is constant of integration, then f(x)=

A. $\sec x = x$

B. $x = \sec x$

C. $\tan x - x$

D. $x - \tan x$

Answer:

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35. If $\int f(x) \sin x \cos x dx = \frac{1}{2(b^2 - a^2)} \log f(x) + c,$

where c is the constant of integration. Then f(x)=

A. $\frac{2}{(b^2 - a^2)\sin 2x}$

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

C. $\frac{2}{(b^2 - a^2)\cos 2x}$

D. $\frac{2}{ab \cos 2x}$

Answer:

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36. If $M = \int_0^{\pi/2} \frac{\cos x}{x+2} dx, N = \int_0^{\pi/4} \frac{\sin x \cos x}{(x+1)^2} dx,$ then the value of M-N is

A. π

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

C. $\frac{2}{\pi - 4}$

D. $\frac{2}{\pi + 4}$

Answer:

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37. The value of the integral $I = \int_{\frac{1}{2014}}^{2014} \frac{\tan^{-1} x}{x} dx$ is

A. $\frac{\pi}{4} \log 2014$

B. $\frac{\pi}{2} \log 2014$

C. $\pi \log 2014$

D. $\frac{1}{2} \log 2014$

Answer:

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38. Let $I = \int_{\frac{\pi}{4}}^{\frac{\pi}{3}} \frac{\sin x}{x} dx$. Then

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

B. $4 \leq 1 \leq 2\sqrt{30}$

C. $\frac{\sqrt{3}}{8} \leq 1 \leq \frac{\sqrt{2}}{6}$

D. $1 \leq 1 \leq \frac{2\sqrt{3}}{\sqrt{2}}$

Answer:

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39. The value of $I = \int_{\pi 2}^{5\pi/2} \frac{e^{\tan^{-1}(\sin x)}}{e^{\tan^{-1}(\sin x)} + e^{\tan^{-1}(\cos x)}} dx$, is

A. 1

B. π

C. e

D. $\pi / 2$

Answer:

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40. The value of $\lim_{n \to \infty} \frac{1}{n} \left\{ \sec^2 \frac{\pi}{4n} + \sec^2 \frac{2\pi}{4n} + \ldots\ldots + \sec^2 \frac{n\pi}{4n} \right\}$ is

A. $\log_e 2$

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

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

D. e

Answer:

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41. The differential equation representing the family of curves $y^2 = 2d(x + \sqrt{d})$ where d is a parameter is of

A. order 2

B. degree 2

C. degree 3

D. degree 4

Answer:

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42. Let y(x) be a solution of $(1-x^2)\frac{dy}{dx}+2xy-4x^2=0$ and $y(0)=-1$. Then y(1) is equal to

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

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

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

D. -1

Answer:

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43. The law of motion of a body moving along a straight line is $x = \frac{1}{2}$ vt, x being its distance from a fixed point on the line at time t and v is its velocity there. Then

A. acceleration f varies directly with x

B. acceleration f varies inversely with x

C. acceleration f is constant

D. acceleration f varies directly with t

Answer:

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44. Find the equation of tangents at the point (1,2) of $y = x^2$

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45. Given that n numbers of A.Ms are inserted between two sets of numbers a, 2b and 2a, b where $a, b, \in R$. Suppose further that the m^{th} means between these sets of numbers are same, then the ratio $a:b$ equals

A. $n - m + 1 : m$

B. $n - m + 1 : n$

C. $n : n - m + 1$

D. $m : n - m + 1$

Answer:

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46. If $x + \log_{10}(1 + 2^x) = x \log_{10} 5 + \log_{10} 6$ then the value of x is

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

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

C. 1

D. 2

Answer:

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47. If $Z_r = \sin\frac{2\pi r}{11} - I\cos\frac{2\pi r}{11}$ then $\sum_{r=0}^{10} Z_r =$

A. -1

B. 0

C. i

D. $-i$

Answer:

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48. If z_1 and z_2 be two non zero complex numbers such that $\frac{z_1}{z_2} + \frac{z_2}{z_1} = 1$, then the origin and the points represented by z_1 and z_2

A. lie on a straight line

B. form a right angled triangle

C. form an equilateral triangle

D. form an isosceles triangle

Answer:

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49. If $b_1b_2 = 2(c_1 + c_2)$ and b_1, b_2, c_1, c_2 are all real numbers, then at least one of the equations $x^2 + b_1x + c_1 = 0$ and $x^2 + b_2x + c_2 = 0$ has

A. real roots

B. purely imaginary roots

C. roots of the form $a + ib(a, b \in R. ab \neq 0)$

D. rational roots

Answer:

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50. The number of selection of n objects from 2n objects of which n are identical and the rest are different is

A. 2^n

B. 2^{n-1}

C. $2^n - 1$

D. $2^{n-1} + 1$

Answer:

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51. Let A be the centre of the circle $x^2 + y^2 - 2x - 4y - 20 = 0$. Let B(1, 7) and $D(4, -2)$ be two points on the circle such that tangents at B and D meet at C. The area of the quadrilateral ABCD is

A. 150sq units

B. 50 sq units

C. 75 sq units

D. 70 sq units

Answer:

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52. Let $f(x)\begin{cases}-2\sin x & \text{if } x \le -\frac{\pi}{2} \\ A\sin x + B & \text{if } -\frac{\pi}{2} < x < \frac{\pi}{2} \\ \cos x & \text{if } x \ge \frac{\pi}{2}\end{cases}$. Then

A. f is discontinuous for all A and B

B. f is continuous for all $A = -1$ and $B = 1$

C. f is continuous for all A= 1 and $B = -1$

D. f is continuous for all real values of A, B

Answer:

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53. The normals to the curve $y = x^2 - x + 1$, drawn at the points with the abscissa $x_1 = 0, x_2 = -1$ and $x_3 = \frac{5}{2}$

A. are parallel to each other

B. are pair wise perpendicular

C. are concurrent

D. are not concurrent

Answer:

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54. The equation x log $x = 3 - x$

A. has no root in (1, 3)

B. has exactly one root in (1,3)

C. $x \log x - (3 - x) > 0$ in [1, 3]

D. $x \log x - (3 - x) < 0$ in [1, 3]

Answer:

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55. Consider the parabola $y^2 = 4x$. Let P and Q be points on the parabola where $P(4, -4)$ & Q(9, 6). Let R be a point on the arc of the parabola between P & Q. Then the area of ΔPQR is largest when

A. $\angle PQR = 90^\circ$

B. R(4, 4)

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

D. $R\left(1, \frac{1}{4}\right)$

Answer:

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56. A ladder 20 ft long leans against a vertical wall. The top end slides downwards at the rate of 2 ft per second. The rate at which the lower end moves on a horizontal floor when it is 12 ft from the wall is

A. $\frac{8}{3}$

B. $\frac{6}{5}$

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

D. $\frac{17}{4}$

Answer:

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57. For $0 \leq p \leq 1$ and for any positive a, b, let $I(p) = (a+b)^p, J(p) = a^p + b^p$, then

A. $I(p) > J(p)$

B. $I(p) \leq J(p)$

C.

$$I(p) < J(p) \text{ in } \left[0, \frac{p}{2}\right] \text{ \& } I(p) > J(p) \text{ in } \left[\frac{p}{2}, \infty\right)$$

D.

$$I(p) < J(p) \text{ in } \left[\frac{p}{2}, \infty\right) \ \& \ J(p) < I(p) \text{ in } \left[0, \frac{p}{2}\right]$$

Answer:

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58. Let $\vec{\alpha} = \hat{i} + \hat{j} + \hat{k}, \vec{\beta} = \hat{i} - \hat{j} - \hat{k}$ and $\vec{\gamma} = -\hat{i} + \hat{j} - \hat{k}$ be three vectors. A vector $\vec{\delta}$, in the plane of $\vec{\alpha}$ and $\vec{\beta}$. Whose projection on $\vec{\gamma}$ is $\frac{1}{\sqrt{3}}$, is given by

A. $-\hat{i} - 3\hat{j} - 3\hat{k}$

B. $\hat{i} - 3\hat{j} - 3\hat{k}$

C. $-\hat{i} + 3\hat{j} + 3\hat{k}$

D. $\hat{i} + 3\hat{j} - 3\hat{k}$

Answer:

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59. Let $\vec{\alpha}, \vec{\beta}, \vec{\gamma}$ be three unit vectors such that $\vec{\alpha}.\vec{\beta} = \vec{\alpha}, \vec{\gamma} = 0$ and the angle between $\vec{\beta}$ and $\vec{\gamma}$ is 30°. Then $\vec{\alpha}$ is

A. $2\left(\vec{\beta} \times \vec{\gamma}\right)$

B. $-2\left(\vec{\beta} \times \vec{\gamma}\right)$

C. $\pm 2\left(\vec{\beta} \times \vec{\gamma}\right)$

D. $\left(\vec{\beta} \times \vec{\gamma}\right)$

Answer:

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60. Let z_1 and z_2 be complex numbers such that $z_1 \neq z_2$ and $|z_1| = |z_2|$. If Re $(z_1) > 0$ and $1M(z_2) < 0$, then $\frac{z_1 + z_2}{z_1 - z_2}$ is

A. one

B. real and positive

C. real nad negative

D. purely imaginary

Answer:

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61. From a collection of 20 consecutive natural numbers, four are selected such that they are not consecutive. The number of such selections is

A. 284×17

B. 285×17

C. 284×16

D. 285×16

Answer:

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62. The least positive integer n such that $\begin{pmatrix} \cos\frac{\pi}{4} & \sin\frac{\pi}{4} \\ -\sin\frac{\pi}{4} & \cos\frac{\pi}{4} \end{pmatrix}$ is an identity matrix of order 2 is

A. 4

B. 8

C. 12

D. 16

Answer:

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63. Let ρ be a relation defined on 11, the set of natural numbers, as $\rho = \{(x, y) \in K \times H : 2x + y = 41\}$ then

A. ρ is an equivalence relation

B. ρ is only reflexive relation

C. ρ is only symmetric relation

D. ρ is not transitive

Answer:

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64. If the polynomial

$$f(x)=\begin{vmatrix}(1+x)^a & (2+x)^b & 1\\ 1 & (1+x)^a & (2+x)^b\\ (2+x)^b & 1 & (1+x)^a\end{vmatrix},$$ then the constant term of f(x) is

[a and b are positive integers]

A. $2 - 3.2^{b} + 2^{3b}$

B. $2 + 3.2^{b} + 2^{3b}$

C. $2 + 3.2^{b} - 2^{3b}$

D. $2 - 3.2^{b} - 2^{3b}$

Answer:

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65. A line cuts the x-axis at A(5,0) and the y-axis at $B(0, -3)$. A variable line PQ is drawn perpendicular to AB cutting the x-axis at P and the y-axis at Q. If AQ and BP meet at R, then the locus of R is

A. $x^2 + y^2 - 5x + 3y = 0$

B. $x^2 + y^2 + 5x + 3y = 0$

C. $x^2 + y^2 + 5x - 3y = 0$

D. $x^2 + y^2 - 5x - 3y = 0$

Answer:

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66. In a third order matrix A, a_{ij} denotes the elements in the i-th row j-th column. If $\begin{cases} a_{ij} = 0 & i = j \\ a_{ij} = 1 & i > j \\ a_{ij} = -1 & i < j \end{cases}$

Then the matrix is

A. skew symmetric

B. symmetric

C. not invertible

D. non-singular

Answer:

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67. The area of the triangle formed by the intersection of a line parallel to x-axis and passing through P(h, k), with the lines y= x and $x + y = 2$ is h^2. The locus of the point P is

A. $x = y - 1$

B. $x = -(y - 1)$

C. $x = 1 + y$

D. $x = -(1 + y)$

Answer:

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68. A hyperbola, having the transverse axis of length $2\sin\theta$ is confocal with the ellipse $3x^2+4y^2=12$. Its equation is

A. $x^2\sin^2\theta - y^2\cos^2\theta = 1$

B. $x^2\cos ec^2\theta - y^2\sec^2\theta = 1$

C. $(x^2+y^2)\sin^2\theta = 1+y^2$

D. $x^2\cos ec^2\theta = x^2+y^2+\sin^2\theta$

Answer:

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69. Let $f(x) = \cos\left(\frac{\pi}{x}\right), x \neq 0$ then assuming k as in integer

A. f(x) increases in the interval $\left(\frac{1}{2k+1}, \frac{1}{2k}\right)$

B. f(x) decreases in the interval $\left(\frac{1}{2k+1}, \frac{1}{2k}\right)$

C. f(x) decreases in the interval $\left(\frac{1}{2k+2}, \frac{1}{2k+1}\right)$

D. f(x) increases in the interval $\left(\frac{1}{2k+2}, \frac{1}{2k+1}\right)$

Answer:

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70. Consider the functin $y = \log_a\left(x + \sqrt{x^2+1}\right)$. $a > 0, a \neq 1$. The inverse of the

function

A. does not exist

B. is $x = \log_{1a}\left(y - \sqrt{y^2 + 1}\right)$

C. is $x = \sin h(y \ln a)$

D. is $x = \cos h\left(-y\ln\frac{1}{a}\right)$

Answer:

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71. Let $I = \int_0^1 \frac{x^3 \cos 3x}{2 + x^2} dx$. Then

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

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

C. $1 < I < 1$

D. $-\frac{3}{2} < 1 < \frac{3}{2}$

Answer:

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72. A particle is in motion along a curve $12y = x^3$. The rate of change of its ordinate exceeds that of abscissa in

A. $-2 < x < 2$

B. $x = \pm 2$

C. $x < -2$

D. $x > 2$

Answer:

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73. The area of the region lying above x-axis, and included between the circle $x^2 + y^2 = 2ax$ & the parabola $y^2 = ax, a > 0$ is

A. $8\pi a^2$

B. $a^2\left(\frac{\pi}{4} - \frac{2}{3}\right)$

C. $\frac{16\pi a^2}{9}$

D. $\pi\left(\frac{27}{8} + 3a^2\right)$

Answer:

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74. If the equation $x^2 - cx + d = 0$ has roots equal to the fourth powers of the roots of $x^2 + ax + b = 0$, where $a^2 > 4b$, then the roots of $x^2 - 4bx + 2b^2 - c = 0$ will be

A. both real

B. both negative

C. both positive

D. one positive and one negative

Answer:

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75. On the occasion of Dipawali festival each student of a class sends greeting cards to others. If there are 20 students in the class, the number of cards sends by students is

A. ${}^{20}C_2$

B. ${}^{20}P_2$

C. $2 \times {}^{20}C_2$

D. $2 \times {}^{20}P_2$

Answer:

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