MATHS

BOOKS - MTG MATHS (BENGALI ENGLISH)

QUESTION PAPER 2014

Multiple Choice Questions

1. The number of solution(s) of the equation $\sqrt{x+1}-\sqrt{x-1}=\sqrt{4x-1}$ is/are

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2. The value of $|z|^2+|z-3|^2+|z-i|^2$ is minimum when z equals -

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

B. $45 + 3i$

C. $1 + \frac{i}{3}$

D. $1 - \frac{i}{3}$

Answer:

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3. If $f(x) = \begin{cases} 2x^2 + 1, & x \leq 1 \\ 4x^3 - 1, & x > 1 \end{cases}$, then $\int_0^2 f(x)dx$ is

A. $47/3$

B. $50/3$

C. $1/3$

D. $47/2$

Answer:

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4. If $\lim_{x \to 0} \frac{2a \sin x - \sin 2x}{\tan^3 x}$ exists and is equal to 1, then the value of a is

A. 2

B. 1

C. 0

D. -1

Answer:

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5. The solution of the equation

$\log_{101} \log_7 \left(\sqrt{x+7} + \sqrt{x}\right) = 0$ is -

A. 3

B. 7

C. 9

D. 49

Answer:

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6. The integrating factor of the differential equation

$\left(1+x^2\right)\frac{dy}{dx}+y=e^{\tan^{-1}x}$ is

A. $\tan^{-1}x$

B. $1+x^2$

C. $e^{\tan^{-1}x}$

D. $\log_e\left(1+x^2\right)$

Answer:

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7. If $\sqrt{y}=\cos^{-1}x$, then it satisfies the differential equation $\left(1-x^2\right)\frac{d^2y}{dx^2}-x\frac{dy}{dx}=c$, where c is equal to-

A. 0

B. 3

C. 1

D. 2

Answer:

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8. The number of digits in 20^{301} (given `log_(10)2=0.3010) is

A. 602

B. 301

C. 392

D. 391

Answer:

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9. The area of the region bounded by the curves $y = x^2$ and $x = y^2$ is-

A. $1/3$

B. $1/2$

C. $1/4$

D. 3

Answer:

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10. Let $\mathbb{R}$ be the set of all real numbers and $f: R \to R$ be given by $f(x) = 3x^2 + 1$ then the set $f^{-1}(1 \quad 6)$ is -

A. $\left\{-\sqrt{\frac{5}{3}}, 0, \sqrt{\frac{5}{3}}\right\}$

B. $\left[-\sqrt{\frac{5}{3}}, \sqrt{\frac{5}{3}}\right]$

C. $\left[-\sqrt{\frac{1}{3}}, \sqrt{\frac{1}{3}}\right]$

D. $\left(-\sqrt{\frac{5}{3}}, \sqrt{\frac{5}{3}}\right)$

Answer:

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11. The value of $\tan\frac{\pi}{5} + 2\tan\frac{2\pi}{5} + 4\cot\frac{4\pi}{5}$ is

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

B. $\cot\frac{2\pi}{5}$

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

D. $\cot\frac{3\pi}{5}$

Answer:

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12. Let f(x) be a differentiable function in $[2, 7]$. If $f(2) = 3$ and $f'(x) \leq 5$ for all x in (2, 7), then the maximum possible value of f(x) at x = 7 is-

A. 7

B. 15

C. 28

D. 14

Answer:

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13. If set A contains p elements and set B contains q elements then their total number of reletions from A to B is-

A. 2^{p+q}

B. 2^{pq}

C. $p + q$

D. pq

Answer:

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14. In a ΔABC , tan A and tanB are the roots of $pq(x^2+1)=r^2x$. Then ΔABC is

A. a right angled triangle

B. an acute angled triangle

C. an obtuse angled triangle

D. an equilateral triangle

Answer:

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15. If $y = 4x + 3$ is parallel to a tangent to the parabola $y^2 = 12$x, then its distance from the normal parallel to the given line is

A. $\frac{213}{\sqrt{17}}$

B. $\frac{219}{\sqrt{17}}$

C. $\frac{211}{\sqrt{17}}$

D. $\frac{210}{\sqrt{17}}$

Answer:

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16. Let the equation of an ellipse be $\frac{x^2}{144} + \frac{y^2}{25} = 1$. Then the radius of the circle with centre $(0, \sqrt{2})$ and passing through the foci of the ellipse is

A. 9

B. 7

C. 11

D. 5

Answer:

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17. The straight lines $x + y = 0, 5x + y = 4 \text{ and } x + 5y = 4$ form

A. an isosceles triangle

B. an equilateral triangle

C. a scalene triangle

D. a right angled triangle

Answer:

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18. If $\sin^{-1}\left(\frac{x}{13}\right) + \text{cosec}^{-1}\left(\frac{13}{12}\right) = \frac{\pi}{2}$, then the value of x is

A. 5

B. 4

C. 12

D. 11

Answer:

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19. The values of λ for which the curve $(7x + 5)^2 + (7y + 3)^2 = \lambda^2(4x + 3y - 24)^2$ represents a parabola is

A. $\pm \frac{6}{5}$

B. $\pm \frac{7}{5}$

C. $\pm \frac{1}{5}$

D. $\pm\frac{2}{5}$

Answer:

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20. Let $f(x) = x + 1/2$. Then the number of real values of x for which the three unequal terms $f(x), f(2x), f(4x)$ are in H.P. is

A. 1

B. 0

C. 3

D. 2

Answer:

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21. Let $f(x) = 2x^2 + 5x + 1$. If we write f(x) as

$f(x) = a(x+1)(x-2) + b(x-2)(x-1) + c(x-1)(x+1)$

for real numbers a, b, c, then

A. there are infinite number of choices for a,b,c

B. only one choice for a but infinite number of choices for b and c

C. exactly one choice for each of a,b,c

D. more than one but finite number of choices for a,b,c

Answer:

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22. If α, β are the roots of $ax^2 + bx + c = 0 (a \neq 0)$ and $a + h, \beta + h$ are the roots of $px^2 + qx + r = 0 (p \neq 0)$ then the ratio of the squares of their discriminants is

A. $a^2 : p^2$

B. $a : p^2$

C. $a^2 : p$

D. $a : 2p$

Answer:

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23. Let p, q be real numbers . If α is the root of $x^2 + 3p^2x + 5q^2 = 0$, β is a root of $x^2 + 9p^2x + 15q^2 = 0$ and $0 < \alpha < \beta$, then the equation $x^2 + 6p^2x + 10q^2 = 0$ has a root γ that always satisfies

A. $\gamma = \alpha / 4 + \beta$

B. $\beta < \gamma$

C. $\gamma = \alpha / 2 + \beta$

D. $\alpha < \gamma < \beta$

Answer:

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24. The equation of the common tangent with positive slope to the parabola $y^2 = 8\sqrt{3}x$ and the hyperbola $4x^2 - y^2 = 4$ is

A. $y = \sqrt{6}x + \sqrt{2}$

B. $y = \sqrt{6}x - \sqrt{2}$

C. $y = \sqrt{3}x + \sqrt{2}$

D. $y = \sqrt{3}x - \sqrt{2}$

Answer:

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25. The point on the parabola $y^2 = 64x$ which is nearest to the line $4x + 3y + 35 = 0$ has coordinates

A. $(9, -24)$

B. $(1, 81)$

C. $(4, -16)$

D. $(-9, -24)$

Answer:

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26. Let z_1, z_2 be two fixed complex numbers in the Argand plane and z be an arbitrary point satisfying $|z - z_1| + |z - z_2| = 2|z_1 - z_2|$. Then the locus of z will be

A. an ellipse

B. a straight line joining z_1 and z_2

C. a parabola

D. a bisector of the line segment joining z_1 and z_2

Answer:

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27. The function $f(x)=\frac{\tan\left\{\pi\left[x-\frac{\pi}{2}\right]\right\}}{2+[x]^2}$, where [x] denotes the greatest integer $\leq x$, is

A. continous for all values of x

B. discontinuous at $x=\frac{\pi}{2}$

C. not differentiable for some values of x

D. discontinuous at x = -2

Answer:

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28. The function $f(x)=a\sin|x|+be^{|x|}$ is differentiable at x = 0 when

A. $3a+b=0$

B. $3a-b=0$

C. $a + b = 0$

D. $a - b = 0$

Answer:

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29. If the coefficient of x^8 in $\left(ax^2 + \frac{1}{bx}\right)^{13}$ is equal to the coefficient of x^{-8} in $\left(ax - \frac{1}{bx^2}\right)^{13}$ then a and b will satisfy the relation

A. $ab + 1 = 0$

B. $ab = 1$

C. $a = 1 - b$

D. $a + b = -1$

Answer:

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30. If $I = \int_0^2 e^{x^4}(x - a)dx = 0$, then α lies in the interval

A. $(0, 2)$

B. $(- 1, 0)$

C. $(2, 3)$

D. $(- 2, - 1)$

Answer:

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31. The solution of the differential equation $\frac{dy}{dx} = e^{y+x} + e^{y-x}$ is

A. e^−y=e^x−e^−x+c

B. e^−y=e^−x−e^x+c

C. e^−y=e^−x−e^−x+c

D. e^y=e^x−e^−x+c

Answer:

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32. Suppose that the equation $f(x) = x^2 + bx + c = 0$ has two distinct real roots α and β. The angle between the tangent to the curve $y = f(x)$ at the point $\left(\frac{\alpha+\beta}{2}, f\left(\frac{\alpha+\beta}{2}\right)\right)$ and the positive direction of the x-axis is

A. 0°

B. 30°

C. 60°

D. 90°

Answer:

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33. The function $f(x) = x^2 + bx + c$, where b and c real constants, describes

A. one-to-one mapping

B. onto mapping

C. not one-to-one but onto mapping

D. neither one-to-one nor onto mapping

Answer:

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34. Let $n \geq 2$ bet an integer, $A = \begin{pmatrix} \cos(2\pi/n) & \sin(2\pi/n) & 0 \\ -\sin(2\pi/n) & \cos(2\pi/n) & 0 \\ 0 & 0 & 1 \end{pmatrix}$ and

l is the identity matrix of order 3. Then

A. $A^n = I$ and $A^{n-1} \neq I$

B. $A^m \neq I$ for any positive integer m

C. A is not invertible

D. $A^m = 0$ for a positive integer m

Answer:

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35. Ram is visiting a friend. Ram knows that his friend has 2 children and 1 of them is a boy. Assuming that a child is equally likely to be a boy or a girl, then the probability that the other child is a girl, is

A. $1/2$

B. $1/3$

C. $2/3$

D. $7/10$

Answer:

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36. The value of the sum $\left({}^{n}C_1\right)^2 + \left({}^{n}C_2\right)^2 + \left({}^{n}C_3\right)^2 + \ldots.. + \left({}^{n}C_n\right)^2$ is

A. $\left({}^{2n}C_n\right)^2$

B. ${}^{2n}C_n$

C. ${}^{2n}C_n + 1$

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

Answer:

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37. The remainder obtained when $1! + 2! + 3! + \ldots + 11!$ is divided by 12 is

A. 9

B. 8

C. 7

D. 6

Answer:

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38. Out of 7 consonants and 4 vowels, the number of words (not necessarily meaningful) that can be made, each consisting of 3 consonants and 2 vowels, is

A. 24800

B. 25100

C. 25200

D. 25400

Answer:

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39. Let $S = \frac{2}{1}{}^nC_0 + \frac{2^2}{2}{}^nC_1 + \frac{2^3}{3}{}^nC_2 + \ldots + \frac{2^{n+1}}{n+1}{}^nC_n$. Then S equals

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

B. $\frac{3^{n+1}-1}{n+1}$

C. $\frac{3^n-1}{n}$

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

Answer:

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40. Let $\mathbb{R}$ be the set of all real numbers and $f:[-1,1] \to \mathbb{R}$ be defined by

$$f(x) = \begin{cases} x\sin\frac{1}{x}, & x \neq 0 \\ 0, & x = 0 \end{cases}$$

Then

A. f satisfies the conditions of Rolle's theorem on [-1, 1]

B. f satisfies the conditions of Lagrange's Mean Value Theorem on [-1, 1]

C. f satisfies the conditions on Rolle's theorem on [0,1]

D. f satisfies the conditons of Lagrange's Mean Value Theorem on [0, 1]

Answer:

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41. If a, b and c are positive numbers in a G.P., then the roots of the quadratic equation $(\log_e a)x^2 - (2\log_e b)x + (\log_e C) = 0$ are

A. $-1 \text{ and } \frac{\log_e c}{\log_e a}$

B. $1 \text{ and } -\frac{\log_e c}{\log_e a}$

C. $1 \text{ and } \log_a c$

D. $-1 \text{ and } \log_c a$

Answer:

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42. There is a group of 265 persons who like either singing or dancing or painting. In this group 200 like singing, 110 like dancing and 55 like painting. If 60 persons like both singing and dancing, 30 like both singing and painting and 10 like all three activities, then the number of persons who like only dancing and painting is

A. 10

B. 20

C. 30

D. 40

Answer:

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43. The range of the function $y = 3\sin\left(\sqrt{\frac{\pi^2}{16} - x^2}\right)$ is

A. $\left[0, \sqrt{3/2}\right]$

B. $[0, 1]$

C. $\left[0, 3\sqrt{2}\right]$

D. $[0, \infty)$

Answer:

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44. The value of $\lim_{x \to 0} \frac{\int_0^{x^2} \cos(t^2)\, dt}{x \sin x}$ is

A. 1

B. -1

C. 2

D. $\log_e 2$

Answer:

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45. Let $f(x)$ be a differentiable function and $f'(4) = 5$. Then $\lim_{x \to 2} \frac{f(4) - f(x^2)}{x - 2}$ equals

A. 0

B. 5

C. 20

D. -20

Answer:

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46. The sum of the series $\sum_{n=1}^{\infty} \sin\left(\frac{n!\pi}{720}\right)$ is

A. $\sin\left(\frac{\pi}{180}\right)+\sin\left(\frac{\pi}{360}\right)+\sin\left(\frac{\pi}{540}\right)$

B. $\sin\left(\frac{\pi}{6}\right)+\sin\left(\frac{\pi}{30}\right)+\sin\left(\frac{\pi}{120}\right)+\sin\left(\frac{\pi}{360}\right)$

C. $\sin\left(\frac{\pi}{6}\right)+\sin\left(\frac{\pi}{30}\right)+\sin\left(\frac{\pi}{120}\right)+\sin\left(\frac{\pi}{360}\right)+\sin\left(\frac{\pi}{720}\right)$

D. $\sin\left(\frac{\pi}{180}\right)+\sin\left(\frac{\pi}{360}\right)$

Answer:

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47. Let I denote the 3×3 identity matrix and P be a matrix obtained by rearranging the columns of I. Then

A. there are six distinct choices for P and det(P) = 1

B. there are six distinct choices for P and det(P) = ± 1

C. there are more than one choices for P and some of them are not invertible

D. there are more than one choices for P and P^{-1} = I in each choice

Answer:

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48. The coefficient of x^3 in the infinite series expansion of $\frac{2}{(1-x)(2-x)}$, for $|x| < 1$, is

A. $-1/16$

B. $15/8$

C. $-1/8$

D. $15/16$

Answer:

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49. For every real number x, let $f(x) = \frac{x}{1!} + \frac{3}{2!}x^2 + \frac{7}{3!}x^3 + \frac{15}{4!}x^4 + \dots$

Then the equation $f(x) = 0$ has

A. no real solution

B. exactly one real solution

C. exactly two real solutions

D. infinite number of real solutions

Answer:

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50. Let S denote the sum of the infinite series $1 + \frac{8}{2!} + \frac{21}{3!} + \frac{40}{4!} + \frac{65}{5!} + \ldots..$ Then

A. $S < 8$

B. $S > 12$

C. $8 < S < 12$

D. $S = 8$

Answer:

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51. Let [x] denote the greatest integer less than or equal to x for any real number x. Then $\lim_{n \to \infty} \frac{\left[n\sqrt{2}\right]}{n}$ is equal to

A. 0

B. 2

C. $\sqrt{2}$

D. 1

Answer:

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52. Suppose that $f(x)$ is a differentiable function such that f'(x) is continuous, $f'(0) = 1$ and f''(0) does not exist. Let g(x) = xf'(x). Then

A. g'(0) does not exist

B. g'(0) = 0

C. g'(0) = 1

D. g'(0) = 2

Answer:

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53. Let z_1 be a fixed point on the circle of radius 1 centered at the origin in the Argand plane and $z_1 \neq \pm 1$. Consider an equilateral triangle incribed in the circle with z_1, z_2, z_3 as the vertices taken in the counter clockwise direction. Then $z_1 z_2 z_3$ is equal to

A. z_1^2

B. z_1^3

C. z_1^4

D. z_1

Answer:

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54. Suppose that z_1, z_2, z_3 are three vertices of an equilateral triangle in the Argand plane. Let $\alpha = \frac{1}{2}(\sqrt{3} + i)$ and β be a non-zero complex number. The point $\alpha z_1 + \beta, \alpha z_2 + \beta, a z_3 + \beta$ will be

A. the vertices of an equilateral triangle

B. the vertices of an isosceles triangle

C. collinear

D. the vertices of a scalene triangle

Answer:

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55. The curve $y = (\cos x + y)^{1/2}$ satisfies the differential equation

A. $(2y-1)\frac{d^2y}{dx^2}+2\left(\frac{dy}{dx}\right)^2+\cos x=0$

B. $\frac{d^2y}{dx^2}-2y\left(\frac{dy}{dx}\right)^2+\cos x=0$

C. $(2y-1)\frac{d^2y}{dx^2}-2\left(\frac{dy}{dx}\right)^2+\cos x=0$

D. $(2y-1)\frac{d^2y}{dx^2}-\left(\frac{dy}{dx}\right)^2+\cos x=0$

Answer:

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56. In the Argand plane, the distinct roots of $1+z+z^3+z^4=0$(z is a complex number) represent vertices of

A. a square

B. an equilateral triangle

C. a rhombus

D. a rectangle

Answer:

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57. If A, B, C are the angles of a triangle then $\tan\left(\frac{B+C}{2}\right) =$

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

B. $\cot\frac{A}{2}$

C. $\cos\frac{A}{2}$

D. $\sec\frac{A}{2}$

Answer: b

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58. Let α, β be the roots of $x^2 - x - 1 = 0$ and $S_n = a^n + \beta^n$, for all integers $n \geq 1$. Then for every integer $n > 2$,

A. $S_n + S_{n-1} = S_{n+1}$

B. $S_n - S_{n-1} = S_{n+1}$

C. $S_{n-1} = S_{n+1}$

D. $S_n + S_{n-1} = 2S_{n+1}$

Answer:

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59. A fair six-faced die is rolled 12 times. The probability that each face turns up twice is equal to

A. $\frac{12!}{6!6!6^{12}}$

B. $\frac{2^{12}}{2^6 6^{12}}$

C. $\frac{12!}{2^6 6^{12}}$

D. $\frac{12!}{6^2 6^{12}}$

Answer:

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60. If α, β are the roots of the quadratic equation $x^2 + px + q = 0$, then the vlaues of $\alpha^3 + \beta^3$ and $\alpha^4 + \alpha^2\beta^2 + \beta^4$ are respectively

A. $3pq - p^3$ and $p^4 - 3p^2q + 3q^2$

B. $-p(3q - p^2)$ and $(p^2 - q)(p^2 + 3q)$

C. $pq - 4$ and $p^4 - q^4$

D. $3pq - p^3$ and $(p^2 - q)(p^2 - 3q)$

Answer:

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61. The solution of the differential equation

$$\frac{dy}{dx} + \frac{y}{x \log_e x} = \frac{1}{x}$$

under the condition $y = 1$ when x = e is

A. $2y = \log_e x + \frac{1}{\log_e x}$

B. $y = \log_e x + \frac{2}{\log_e x}$

C. $y \log_e x = \log_e x + 1$

D. $y = \log_e x + e$

Answer:

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62. Let f(x) = max $\{x + |x|, x - [x]\}$, where [x] denotes the greatest integer $\leq x$. Then the value of $\int_{-3}^{3} f(x) dx$ is

A. 0

B. $51/2$

C. $21/2$

D. 1

Answer:

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63. Let $X_n = \left\{z = x + iy : |z|^2 \leq \frac{1}{n}\right\}$ for all integers $n \geq 1$. Then $\bigcap_{n=1}^{\infty} X_n$ is

A. a singleton set

B. not a finite set

C. an empty set

D. a finite set with more than one elements

Answer:

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64. Applying Lagrange's Mean Value Theorem for a suitable function $f(x)$ is [0, h], we have $f(h) = f(0) + hf'(\theta h), 0 < \theta < 1$. Then for f(x) = cosx, the value of $\lim_{h \to 0^+} \theta$ is

A. 1

B. 0

C. $1/2$

D. $1/3$

Answer:

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65. The equation of hyperbola whose coordinates of the foci are $(\pm 8, 0)$ and the length of latus rectum is 24 units, is

A. $3x^2 - y^2 = 48$

B. $4x^2 - y^2 = 48$

C. $x^2 - 3y^2 = 48$

D. $x^2 - 4y^2 = 48$

Answer:

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66. A student answers a multiple choice question with 5 alternatives, of which exactly one is correct. The probability that he knows the correct answer is p, $0 < p < 1$. If he does not know the correct answer, he randomly ticks one answer. Given that he has answered the question correctly, the probability that he did not tick the answer randomly, is

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

B. $\frac{5p}{3p+2}$

C. $\frac{5p}{4p+1}$

D. $\frac{4p}{3p+1}$

Answer:

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67. $\cos\frac{2\pi}{7} + \cos\frac{4\pi}{7} + \cos\frac{6\pi}{7}$

A. is equal to zero

B. lies between 0 and 3

C. is a negative number

D. lies between 3 and 6

Answer:

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68. Suppose $M=\int_0^{\pi/2}\frac{\cos x}{x+2}dx, N=\int_0^{\pi/4}\frac{\sin x \quad \cos x}{(x+1)^2}dx.$ Then the value of $(M-N)$ equals

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

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

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

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

Answer:

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69. For any two real numbers θ and φ, we define $\theta R \varphi$ if and only if $\sec^2\theta - \tan^2\varphi = 1$. The relation R is

A. reflexive but not transitive

B. symmetric but not reflexive

C. both reflexive and symmetric but not transitive

D. an equivalence relation

Answer:

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70. The minimum value of $2^{\sin x} + 2^{\cos x}$ is

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

B. $2^{1+\frac{1}{\sqrt{2}}}$

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

D. 2

Answer:

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71. We define a binary relation ~ on the set of all 3×3 real matrices as A~B if and only if there exist invertible matrices P and Q such that $B = PAQ^{-1}$. The binary relation ~ is

A. neither reflexive or symmetric

B. reflexive and symmetric but not transitive

C. symmetric and transitive but not reflexive

D. an equivalence relation

Answer:

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72. Let α, β denote the cube roots of unity other than 1 and $\alpha \neq \beta$. Let

$$s = \sum_{n=0}^{302} (-1)^n \left(\frac{\alpha}{\beta}\right)^n.$$

Then the value of s is

A. either -2ω or $-2\omega^2$

B. either -2ω or $2\omega^2$

C. either 2ω or $-2\omega^2$

D. either 2ω or $2\omega^2$

Answer:

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73. Let t_n denote the nth term of the infinite series

$$\frac{1}{1!} + \frac{10}{2!} + \frac{21}{3!} + \frac{34}{4!} + \frac{49}{5!} + \dots$$

Then $\lim_{n \to \infty} t_n$ is

A. e

B. 0

C. e^2

D. 1

Answer:

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74. A particle starting from a point A and moving with a positive constant acceleration along a straight line reaches another point B in time T. Suppose that the initial velocity of the particle is $u > 0$ and P is midpoint of the line AB. If the velocity of the particle at point P is v_1 and if the velocity at time $\frac{T}{2}$ is v_2, then

A. $v_1 = v_2$

B. $v_1 > v_2$

C. $v_1 < v_2$

D. $v_1 = \frac{1}{2}v_2$

Answer:

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75. A poker hand consists of 5 cards drawn at random from a well-shuffled pack of 52 cards. Then the probability that a poker hand consists of a pair and a triple of equal face values (for example, 2 sevens and 3 kings or 2 aces and 3 queens, etc.) is

A. $\frac{6}{4165}$

B. $\frac{23}{4165}$

C. $\frac{1797}{4165}$

D. $\frac{1}{4165}$

Answer:

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76. If u(x) and v(x) are two independent solutions of the differential equation

$$\frac{d^2y}{dx^2} + b\frac{dy}{dx} + cy = 0,$$

then additional solution (s) of the given differential equation is (are)

A. $y = 5u(x) + 8v(x)$

B. $y = c_1\{u(x) - v(x)\} + c_2 v(x)$, c_1 and c_2 are arbitrary constants

C. $y = c_1 u(x)v(x) + c_2 u(x)/v(x)$, c_1 and c_2 are arbitrary constants

D. $y = u(x)v(x)$

Answer:

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77. The angle of intersection between the curves $y = [|\sin x| + |\cos x|]$ and $x^2 + y^2 = 10$, where [x] denotes the greatest integer $\leq x$, is

A. $\tan^{-1} 3$

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

C. $\tan^{-1} \sqrt{3}$

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

Answer:

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78. Let $f(x) = \begin{cases} \int_0^x |1-t| dt, & x > 1 \\ x - \frac{1}{2}, & x \leq 1 \end{cases}$

Then

A. f(x) is continuous at x = 1

B. f(x) is not continuous at x = 1

C. f(x) is differentiable at x = 1

D. f(x) is not differentiable at x = 1

Answer:

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79. If the circle $x^2 + y^2 + 2gx + 2fy + c = 0$ cuts the three circles $x^2 + y^2 - 5 = 0, x^2 + y^2 - 8x - 6y + 10 = 0$ and $x^2 + y^2 - 4x + 2y - 2$ at the extremities of their diameters, then

A. c = - 5

B. $fg = 147/25$

C. $g + 2f = c + 2$

D. $4f = 3g$

Answer:

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80. For two events A and B, let P(A) = 0.7 and P(B) = 0.6. The necessarily false statement(s) is/are

A. $P(A \cap B) = 0.35$

B. $P(A \cap B) = 0.45$

C. $P(A \cap B) = 0.65$

D. $P(A \cap B) = 0.28$

Answer:

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