MATHS

BOOKS - KVPY PREVIOUS YEAR

MOCK TEST 9

Exercise

1. If $\sin x + \cos x = \sqrt{y + \frac{1}{y}}, y > 0, x \in [0, \pi]$, then find the least value of x satisfying the given conditions.

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

B. y=0

C. y=2

D. $x = \frac{3\pi}{4}$

Answer:

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2. If $f(x) = x + \tan x$ and f is the inverse of g, then $g'(x)$ is equal to

A. $\dfrac{1}{1 + [g(x) - x]^2}$

B. $\dfrac{1}{2 - [g(x) - x]^2}$

C. $\dfrac{1}{2 + [g(x) - x]^2}$

D. None of these

Answer:

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3. If $(\log)_{0.3}(x - 1) < (\log)_{0.09}(x - 1)$, then x lies in the interval $(2, \infty)$ (b) $(1, 2)$ $(-2, -1)$ (d) None of these

A. $(2, \infty)$

B. -1.2

C. (-2,-1)

D. None of these

Answer:

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4. The minimum value of the sum of real number $a^{-5}, a^{-4}, 3a^{-3}, 1, a^{8}, and a^{10} with a > 0$ is

A. 5

B. 13

C. 8

D. 11

Answer:

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5. Let n be an odd integer . If $\sin n\theta = \sum_{r=0}^{n} b_r \sin^r \theta$ for all real θ is

A. $b_0 = 1, b_1 = 3$

B. $b_0 = 0, b_1 = n$

C. $b_0 = -1, b_1 = n$

D. $b_0 = 0, b_1 = n^2 - 3n + 3$

Answer:

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6. The circle passing through the point (-1,0) and touching the y-axis at (0,2) also passes through the point (A) (-3/2,0) (B) (-5/2,2) (C) (-3/2,5/2) (D) (-4,0) â€˜.. 2 2)

A. $\left(-\frac{3}{2}, 0\right)$

B. $\left(-\frac{5}{2}, 2\right)$

C. $\left(-\frac{3}{2}, \frac{5}{2}\right)$

D. (-4,0)

Answer:

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7. Let P(6,3) be a point on the hyperbola parabola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$If the normal at the point intersects the x-axis at (9,0), then the eccentricity of the hyperbola is

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

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

C. $\sqrt{2}$

D. $\sqrt{3}$

Answer:

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8. Let $P(x)$ be a polynomial of least degree whose graph has three points of inflection $(-1, -1)$, $(1.1)$and a point with abscissa 0 at which the curve is inclined to the axis of abscissa at an angle of 60°. Then find the value of $\int_0^1 p(x)dx$.

A. $\frac{3\sqrt{3}+4}{14}$

B. `frac(3sqrt3)(7)

C. $\frac{\sqrt{3}+\sqrt{7}}{14}$

D. $\frac{\sqrt{3}+2}{7}$

Answer:

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9. $If|z| = \max\{|z-1|, |z+1|\}$, then

A. $|z+\bar{z}| = \frac{1}{2}$

B. $z+\bar{z} = 1$

C. $|z+\bar{z}| = 1$

D. None of these

Answer:

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10. The number of ordered triplets (a, b, c) such that $L.C.M.(a, b) = 1000, L.C.M.(b, c) = 2000$ and $L.C.M.(c, a) = 2000$

A. 70

B. 80

C. 90

D. None of these

Answer:

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11. If m things are distributed among a men and b women. Then the probability that number of things received by men is odd is

A. 3b

B. 4b

C. 2b

D. b

Answer:

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12. Solve for $x : 4^x 3^{x-1/2} = 3^{x+1/2} - 2^{2x-1}$.

A. 0

B. 1

C. 2

D. None of these

Answer:

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13. The equation, $2x^2+3y^2-8x-18y+35=K$ represents

A. no locus if k gt 0

B. an ellipse if k lt 0

C. a point if k =0

D. a hyperbola if k gt 0

Answer:

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14. If f be decreasing continuous function satisfying $f(x+y) = f(x) + f(y) - f(x)f(y) Y x, y \varepsilon R, f'(0) = 1$ then $\int_0^1 f(x)dx$ is

A. 1

B. $1 - e$

C. $2 - e$

D. 2

Answer:

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15. The co-ordinates of the points on the barabola $y^2 = 8x$, which is at minium distance from the circle $x^2 + (y+6)^2 = 1$ are

A. (2,-4)

B. (18,-12)

C. -2.4

D. None of these

Answer:

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16. Let $\vec{a}, \vec{b}$, and $\vec{c}$ be three non zero vector such that no two of these are collinear. If the vector $\vec{a} + 2\vec{b}$ is collinear with $\vec{c}$ and $\vec{b} + 3\vec{c} iscol \in earwith$veca (lamda $be \in gsomenonzeroscalar)then$veca\+2vecb+6vecc$equals(A)$lamdaveca (B)lamdavecb(C)lamdavecc` (D) 0

A. 0

B. $\lambda \vec{b}$

C. $\lambda \vec{c}$

D. $\lambda \vec{a}$

Answer:

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17. If a chord, which is not a tangent, of the parabola $y^2 = 16x$ has the equation 2x+y=p, and midpoint (h,k), then which of the following is (are) possible value(s) of p,h and k ?

A. p=-2,h=2,k=-4

B. p=-1,h= 1,k=-3

C. p=2,h=3,k=-4

D. p=5,h=4,k=-3

Answer:

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18. If $b^2 > 4ac$, then $a(x^2+4x+4)^2 + b(x^2+4x+4) + c = 0$ has distinct real roots if :

A. blt alt 0lt c

B. alt blt 0lt c

C. blt 0lt alt c

D. None of these

Answer:

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19. $\lim_{n \to \infty} \prod_{r=3}^{n} \frac{r^3 - 8}{r^3 + 8}$

A. $\frac{2}{7}$

B. $\frac{3}{7}$

C. $\frac{4}{7}$

D. $\frac{6}{7}$

Answer:

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20. If $x+\frac{1}{x}=1$ and $p=x^{100}+\frac{1}{x^{1000}}$ and q be the digit at unit place in the number $2^{2^n}+1, n \in N$ and $n>1$, then p+q is equal to ....

A. 8

B. 6

C. 7

D. 0

Answer:

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21. A conical vessel is to be prepared out of a circular sheet of metal of unit radius in order that the vessel has maximum value, the sectorial area that must be removed from the sheet is A_1 and the area of the given sheet is A_2, then $\frac{A_2}{A_1}$ is equal to

A. $2+\sqrt{3}$

B. $2+\sqrt{6}$

C. $3+\sqrt{6}$

D. $3+\sqrt{2}$

Answer:

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22. Maximum number area of rectangle whose two sides are $x=x_0, x=\pi-x_0$ and which is inscribed in a region bounded by y=sin x and X-axis is obtained when $x_0 \in$

A. $\left(\frac{\pi}{4}, \frac{\pi}{3}\right)$

B. $\left(\frac{\pi}{6}, \frac{\pi}{4}\right)$

C. $\left(0, \frac{\pi}{6}\right)$

D. None of these

Answer:

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23. In a binomial distribution $B\left(n, p = \frac{1}{4}\right)$, if the probability of at least one success is greater than or equal to $\frac{9}{10}$, then n is greater than (1) $\frac{1}{(\log)_{10}^{4} - (\log)_{10}^{3}}$ (2) $\frac{1}{(\log)_{10}^{4} + (\log)_{10}^{3}}$ (3) $\frac{9}{(\log)_{10}^{4} - (\log)_{10}^{3}}$ (4) $\frac{4}{(\log)_{10}^{4} - (\log)_{10}^{3}}$

A. $\frac{1}{\log_{10} 4 + \log_{10} 3}$

B. $\frac{9}{\log_{10} 4 - \log_{10} 3}$

C. $\frac{4}{\log_{10} 4 - \log_{10} 3}$

D. $\dfrac{1}{\log_{10} 4 - \log_{10} 3}$

Answer:

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24. The equation of tangent to the curve $y = \int_{x^2}^{x^3} \frac{dt}{1+t^2}$ at $x = 1$ is $\sqrt{3}x + 1 = y$ (b) $\sqrt{2}y + 1 = x$ $\sqrt{3}x + y = 1$ (d) $\sqrt{2}y = x$

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

B. $\sqrt{3}x + 1 = y$

C. $\sqrt{3}x + 1 + \sqrt{3} = y$

D. None of these

Answer:

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25. Find the value of $\int_{-1}^{1}[x^2+\{x\}]dx, where[.]and\{.\}$ denote the greatest function and fractional parts of x, respectively.

A. $\frac{\sqrt{5}\left(\sqrt{5}+1\right)}{2}$

B. $\frac{\sqrt{5}\left(\sqrt{5}-1\right)}{2}$

C. $-\frac{\sqrt{5}\left(\sqrt{5}+1\right)}{2}$

D. $\frac{3-\sqrt{5}}{2}$

Answer:

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