



MATHS

BOOKS - MCGROW HILL EDUCATION MATHS (HINGLISH)

JEE (MAIN) 2020 QUESTIONS (9TH JAN-MORNING)

Jee Main 2020 Questions With Solution Mathematics 9th Jan Morning

1. Let C be the centroid of the triangle with vertices (3, -1) and (2, 4). Let P be the point of intersection of the lines $x + 3y - 1 = 0$ and $3x - y + 1 = 0$. Then the line passing through the points C and P also passes through the point :

A. $(-9, -7)$

B. $(-9, -6)$

C. $(7, 6)$

D. (9, 7)

Answer: B



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2. $2^{\frac{1}{4}} \cdot 4^{\frac{1}{16}} \cdot 8^{\frac{1}{48}} \dots \dots \dots \infty =$

A. $2^{\frac{1}{4}}$

B. 2

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

D. 1

Answer: C



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3. A spherical iron ball 10 cm in radius is coated with a layer of ice of uniform thickness that melts at a rate of $50\text{cm}^3 / \text{min}$. When the thickness of ice is 5 cm, then the rate at which the thickness of ice decreases, is:

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

B. $\frac{1}{54\pi}$

C. $\frac{1}{36\pi}$

D. $\frac{1}{18\pi}$

Answer: D



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4. If $f(x)$ is twice differentiable and continuous function in $x \in [a, b]$ also $f'(x) > 0$ and $f''(x) < 0$ and c in (a, b) then $\frac{f(c) - f(a)}{f(b) - f(a)}$ is greater than

A. $\frac{b - c}{c - a}$

B. 1

C. $\frac{c - a}{b - c}$

D. $\frac{b + a}{b - a}$

Answer: C

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5. Value of $\cos^3\left(\frac{\pi}{8}\right)\cos^3\left(\frac{3\pi}{8}\right) + \sin^3\left(\frac{\pi}{8}\right)\sin^3\left(\frac{3\pi}{8}\right)$ is

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

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

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

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

Answer: B

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6. Find number of real roots of equation $e^{4x} + e^{3x} - 4e^{2x} + e^x + 1 = 0$

is

A. 3

B. 4

C. 1

D. 2

Answer: C



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7. Let $I = \int_0^{2\pi} \frac{x \sin^8 x}{\sin^8 x + \cos^8 x} dx$, then I is equal to :

A. 2π

B. 4π

C. $2\pi^2$

D. π^2

Answer: D



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8. If plane $x + 4y - 2z = 1$, $x + 7y - 5z = \beta$, $x + 5y + \alpha z = 5$ intersects in a line ($R \times R \times R$) then $\alpha + \beta$ is equal to

A. 0

B. 10

C. -10

D. 2

Answer: B



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9. If e_1 and e_2 are the eccentricities of the ellipse $\frac{x^2}{18} + \frac{y^2}{4} = 1$ and the hyperbola $\frac{x^2}{9} - \frac{y^2}{4} = 1$ respectively and (e_1, e_2) is a point on the ellipse $15x^2 + 3y^2 = k$, then the value of k is equal to

A. 14

B. 15

C. 17

D. 16

Answer: D

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10.
$$F(x) = \begin{cases} \left(\frac{\sin(a+2)x + \sin x}{x}, x < 0 \right), & (b, x = 0), & \left(\frac{(x+3x^2)^{\frac{1}{3}} - x^{\frac{1}{3}}}{x^{\frac{4}{3}}}, x > 0 \right) \end{cases}$$

Function is continuous at $x = 0$, find $a + 2b$.

A. -2

B. 1

C. 0

D. -1

Answer: C



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11. If $A = \begin{bmatrix} 1 & 1 & 2 \\ 1 & 3 & 4 \\ 1 & -1 & 3 \end{bmatrix}$, $B = \text{adj } A$ and $C = 3A$ then $\frac{|\text{adj } B|}{|C|}$ is equal to

A. 16

B. 2

C. 8

D. 72

Answer: C



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12. If a circle touches y-axis at (0, 4) and passes through (2, 0) then which of the following can not be the tangent to the circle

A. $4x - 3y + 17 = 0$

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

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

D. $3x - 4y - 24 = 0$

Answer: C



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13. If $\left| \frac{z - i}{z + 2i} \right| = 1$, $|z| = \frac{5}{2}$ then the value of $|z + 3i|$

A. $15/4$

B. $7/2$

C. $\sqrt{10}$

D. $2\sqrt{3}$

Answer: B



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14. If $f'(x) = \tan^{-1}(\sec x + \tan x)$, $x \in \left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$ and $f(0) = 0$ then the value of $f(1)$ is

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

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

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

D. $\frac{\pi - 1}{4}$

Answer: A



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15. The negation of ' $\sqrt{5}$ is an integer or 5 is an irrational number' is

- A. $\sqrt{5}$ is irrational or 5 is an integer.
- B. $\sqrt{5}$ is not an integer or 5 is not irrational.
- C. $\sqrt{5}$ is an integer and 5 is irrational
- D. $\sqrt{5}$ is not an integer and 5 is not irrational

Answer: D



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16. if $f(x) = a + bx + cx^2$, then what is $\int_0^1 f(x)dx$ equal to ?

- A. $2 \left\{ 3f(1) + 2f\left(\frac{1}{2}\right) \right\}$
- B. $\frac{1}{3} \left\{ f(0) + f\left(\frac{1}{2}\right) \right\}$
- C. $\frac{1}{2} \left\{ f(1) + 3f\left(\frac{1}{2}\right) \right\}$
- D. $\frac{1}{6} \left\{ f(0) + f(1) + 4f\left(\frac{1}{2}\right) \right\}$

Answer: D



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17. If the number of five digit numbers with distinct digit and 2 at the 10^{th} place is $336k$, then k is equal to :

A. 8

B. 7

C. 4

D. 6

Answer: A



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18. For observations x_i given $\sum_{i=1}^{10} (X_i - 5) = 10$ and $\sum_{i=1}^{10} (X_i - 5)^2 = 40$ If mean and variance of observations $(x_1 - 3), (x_2 - 3), (x_3 - 3), \dots, (x_{10} - 3)$ is λ & μ respectively then ordered pair (λ, μ) is

A. (6, 3)

B. (3, 6)

C. (3,3)

D. (6,6)

Answer: C



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19. The integral $\int \frac{dx}{(x+4)^{8/7}(x-3)^{6/7}}$ is equal to : (where C is constant of integration)

A. $-\left(\frac{x-3}{x+4}\right)^{-1/7} + C$

B. $\frac{1}{2}\left(\frac{x-3}{x+4}\right)^{3/7} + C$

C. $\left(\frac{x-3}{x+4}\right)^{1/7} + C$

D. $-\frac{1}{13}\left(\frac{x-3}{x+4}\right)^{-13/7} + C$

Answer: C

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20. v36.3

A. $15/16$

B. $9/16$

C. $13/16$

D. $\frac{11}{16}$

Answer: D

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21. If the vectors, $P = (a + 1)i + aj + ak$, $q = ai + (a + 1)j + ak$ and $r = ai + aj + (a + 1)k$, ($a \in R$) are coplanar and $3(p \cdot q)^2 - \lambda|r \times q|^2 = 0$, then the value of λ is _____ .

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22. The projection of the line segment joining the point $(1, -1, 3)$ and $(2, -4, 11)$ on the line joining the points $(-1, 2, 3)$ and $(3, -2, 10)$, is

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23. Find the number of solutions of $\log_{\frac{1}{2}}|\sin x| = 2 - \log_{\frac{1}{2}}|\cos x|$, $x \in [0, 2\pi]$

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24. If for $x \geq 0$, $y = (x)$ is the solution of the differential equation,

$$(x + 1)dy = \left((x + 1)^2 + y - 3 \right) dx, y(2) = 0,$$

then $y(3)$ is equal to



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25. The coefficient of x^4 in the expansion of $(1 + x + x^2)^6$ is



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