MATHS

BOOKS - UNITED BOOK HOUSE

SET (11)

Exercise

1. State which of the following is total number of relations from set A = {a,b,c) to set B = {d,e} is......

A. 2^6

B. 2^8

C. 2^4

D. 2^{15}

Answer:

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2. The value of $\sin\left(\sin^{-1}\left(\frac{1}{3}\right)+\sec^{-1}3\right)+\cos\left(\tan^{-1}\left(\frac{1}{2}\right)+\tan^{-1}2\right)$ is..........

A. 0

B. 1

C. 2

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

Answer:

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3. Let A be a non singular square matarix of order 3×3. Then $|adjA|$ is equal to

A. $|A|$

B. $|A|^2$

C. $|A|^3$

D. $3|A|$

Answer:

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4. If from Lagrange's Mean value theorem we have, $f(4) - f(1) = (4 - 1)$ then find the range of c

A. $1 \leq c \leq 4$

B. $1 \leq c < 4$

C. $1 < c \leq 4$

D. $1 < c < 4.$

Answer:

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5. The value of $\int_{0}^{\pi} \cos^3 x dx$ is........

A. 1

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

C. 0

D. 2

Answer:

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6. If the rate of increasae of the side of a squre is $1c\frac{m}{\sec}$, the rate of increase of the area of the square when its side 2 cm, is

A. $4c\frac{m}{\sec^2}$

B. $4c\frac{m^2}{\sec}$

C. $2c\frac{m}{\sec^2}$

D. $2c\frac{m^2}{\sec}$.

Answer:

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7. If $\vec{a}$ = $2\hat{i} + 4\hat{j} - 3\hat{k}$, $\vec{b} = \hat{i} + 2\hat{j} + m\hat{k}$, and $\left|\vec{a} \times \vec{b}\right|$ =0, then the value of m is.........

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

B. -3

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

D. 3

Answer:

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8. The plane, which passes throught the point (3,2,0) and line $\frac{x-3}{1}=\frac{y-6}{5}=\frac{z-4}{4}$ is

A. x - y + z = 1

B. x + y + z = 5

C. x + 2y - z=1

D. 2x - y + z = 5.

Answer:

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9. choose the correct answer from the given alternatives :

2.if A and B are two independent events and P(A)=3/5 and $P(A \cap B) = \frac{4}{9}$ then the value of P(B) will be -

A. $\frac{5}{9}$

B. $\frac{8}{9}$

C. $\frac{5}{27}$

D. $\frac{20}{27}$

Answer:

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10. For a binomial distribution with n trials , mean and s.d. are 4 and $\sqrt{3}$ respectivley, the value of n is..........

A. 4

B. 16

C. 8

D. 32

Answer:

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11. prove that $\sin^{-1}\cos\sin^{-1}x + \cos^{-1}\sin\cos^{-1}x = \frac{\pi}{2}$

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12. Find the real values of K for which the following system of linear equations has no-trivial solution:

$x - ky - z = 0, kx - y - z = 0, x + y - z = 0$

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13. If A = $\begin{bmatrix}2 & 3\\ 4 & 5\end{bmatrix}$, prove that $A - A^T$ is a skew-symmetric matrix.

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14. Prove that, q(x) = $\begin{cases} \frac{|x|}{x} & when x \neq 0 \\ 0 & when x = 0 \end{cases}$ is discontinuous at x = 0.

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15. State Rolle's theorem.

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16. Evaluate:

$\int x e^x dx$

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17. Find the order and degree of the differential equation

$$\frac{d^3y}{dx^3} + y = 3\sqrt{1 + \left(\frac{dy}{dx}\right)}$$

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18. Show that the function f(x) = log x has neither a maximum nor a minium value.

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19. Let V and S be the volume and surfacea area of a sphere with radius respectivley. Prove that, $2\frac{dV}{dt} = r\frac{ds}{dt}$

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20. Find the direction cosines of the straight line which makes equal angles with the coordinate axes.

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21. Show that the lines $\frac{x-1}{3}=\frac{y+1}{2}=\frac{z-1}{5}$ and $\frac{x+2}{4}=\frac{y-1}{3}=\frac{z+1}{-2}$ do not intersect.

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22. If A and B are two events such that P(A) = P(B) = 1, then show that, P(A + B) = 1.

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23. Eight coins are thrown simultaneously. Show that the probability of getting at least 6 heads is $\frac{37}{256}$.

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24. If $\tan^{-1}\left[\frac{yz}{xr}\right]+\tan^{-1}\left[\frac{zx}{yr}\right]+\tan^{-1}\left[\frac{xy}{zr}\right]=\frac{\pi}{2}$ prove that, $x^2+y^2+z^2=r^2$.

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25. Provet that the producet of the matrics $\begin{bmatrix}\cos^2\alpha\cos\alpha\sin\alpha\\ \cos\alpha\sin\alpha\sin^2\alpha\end{bmatrix}$ and $\begin{bmatrix}\cos^2\beta\cos\beta\sin\beta\\ \cos\beta\sin\beta\sin^2\beta\end{bmatrix}$ is the null matrix when α and β differ by an odd multiple of $\frac{\pi}{2}$.

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26. Solve : $\begin{vmatrix} x+a & b & c \\ a & x+b & c \\ a & b & x+c \end{vmatrix}=0$

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27. If $f(x)=\left(\frac{a+x}{b+x}\right)^{a+b+2x}$ then prove that $f'(0)=\left[2\log\left(\frac{a}{b}\right)+\frac{b^2-a^2}{ab}\right]\left(\frac{a}{b}\right)^{a+b}$

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28. If y = e^u and u = f(x), show that, $\frac{d^2y}{dx^2}$ = $e^u\left[\frac{d^2u}{dx^2}+\left(\frac{du}{dx}\right)^2\right]$.

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29. $\int \frac{dx}{x^n(1+x^n)^{\frac{1}{n}}}$ is

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30. Solve:

$\left(x^2+y^2\right).\,dx-2xydy$ = 0, given y = 0 when x = 1

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31. SolveL $(1+y)^2dx=\left(\tan^{-1}y-x\right)dy$, given that y= 0 when x= -1.

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32. If the points having position vectors $\hat{i} + b\hat{j} + c\hat{k}$, $7\hat{i} + 2\hat{j} + 6\hat{k}$and $5\hat{i} + 2\hat{j} + 5\hat{k}$ are collinear, find the values of b and c.

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33. Let $\vec{a} = 2\hat{i} + 2\hat{j} + 3\hat{k}$, $\vec{b} = -\hat{i} + 2\hat{j} + \hat{k}$, and $\vec{c} = 3\hat{i} + \hat{j}$ be three given vectors, if $\vec{a} + \lambda \vec{b}$ and $\vec{c}$ are perpendicular to each other, find λ.

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34. Evaluate:

$$\int_0^{\frac{\pi}{4}} \left(\sqrt{\tan x} + \sqrt{\cot x}\right) dx$$

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35. A bag contains 5 white, 7 red and 3 black balls. If three balls are drawn one by one without replacement, find the probability that none is red.

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36. A bag contains 5 white and 7 black balls. Find the expectation of a man who is allowed to draw two balls from the bag and who is to receive one rupee for each black ball and two rupees for each white ball drawn.

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37. Using calculus find the length of perpendicular from the point (2,-1) upon the line 3x - 4y + 5 = 0.

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38. Shade the area bounded by y^2 = 8x and y = x above positive direction of x-axis and use calculus to find the area of that part.

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39. Find the equation of the line which passes through the point with position vector $-\hat{i}+2\hat{j}+\hat{k}$ and which is at right angles to each of the lines:

$\frac{2x-1}{4}=\frac{3y+5}{2}=\frac{2-z}{3}$ and $\frac{x}{-3}=\frac{y}{2}=\frac{z}{3}$.

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40. Find the equation of the plane passing through line of intersection of the plane $\vec{r}.\left(\hat{i}+3\hat{j}\right)$ + 6 $=0$ and $\vec{r}.\left(3\hat{i}-\hat{j}-4\hat{k}\right)$ = 0. which is at a unit distance form the origin.

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