MATHS

BOOKS - UNITED BOOK HOUSE

SET 6

Exercise

1. $\tan^{-1}\left(\dfrac{1}{2}\right) + \tan^{-1}\left(\dfrac{1}{3}\right)$-

A. $\dfrac{\pi}{2}$

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

C. $\dfrac{\pi}{3}$

D. $\dfrac{\pi}{6}$

Answer:

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2. If A is non singular 3×3 matrix and $|A|$ =8, then |AdjA|=

A. 8

B. 24

C. 64

D. 512

Answer:

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3. $y = \sin^{-1}\left(\dfrac{x}{2}\right) + \cos^{-1}\left(\dfrac{x}{2}\right)$ then find the value of $\left[\dfrac{dy}{dx}\right]_{x=1}$

A. $\dfrac{\pi}{2}$

B. 0

C. π

D. 1

Answer:

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4. $\displaystyle\int_{-\pi/2}^{\pi/2} |\sin x| dx =$

A. -1

B. 2

C. 1

D. 0

Answer:

5. If $\vec{a} = 2\hat{i} - \hat{j} + \hat{k}$ and $\vec{b} = -\hat{i} + 3\hat{j} + 4\hat{k}$,then $\vec{a} \cdot \vec{b} =$

A. 1

B. 3

C. -3

D. -1

Answer:

6. The line $\dfrac{x - a}{4} = \dfrac{y - b}{3} = \dfrac{z - c}{0}$ is

A. parallel to x-axis

B. parallel to z-axis

C. parallel to xy-plane

D. parallel t yz-plane

Answer:

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7. A ball is drawn from the urn, If in this experiment of a drawing ball, consider the following evets = A = the ball drawn is labelled as 2 or 3 or 6 or 7, B = the ball drawn is lebeleed as 2 or 4 or 6 or 7 then, $P(A/B)$ is

A. $\dfrac{3}{4}$

B. $\dfrac{3}{5}$

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

D. $\dfrac{2}{5}$

Answer:

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8. If X is a random vairalbe, then for any constant $a(\neq o)$ and b, var (ax+b) =

A. a var (x)+b

B. a vr (x)

C. |a| var (x)

D. $a^2 var(x)$

Answer:

9. (Z,*) where a* b = a+b-ab for all $a, b \in Z$ prove that the given binary operation * is associative and commutative.

10. Show that $\sin\left(\cot^{-1}\left(\tan\cos^{-1}x\right)\right) = x$

11. If $A = \begin{bmatrix} x & 1 \\ 1 & 0 \end{bmatrix}$ and $A^2 = I$ then find the value of x.

12. Find the value of $\begin{vmatrix} 1 & 1 & 1 \\ 4 & 3 & 2 \\ 4^2 & 3^2 & 2^2 \end{vmatrix}$

13. $f(x) = \begin{cases} kx + 1 & x \leq \pi \\ \cos x & x > \pi \end{cases}$ If f(x) is continous at $x = \pi$ then find k.

14. if $y = \left(x + \sqrt{x^2 + a^2}\right)^n$ then prove that

$$\frac{dy}{dx} = \frac{ny}{\sqrt{x^2 + a^2}}$$

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15. Evaluate: $\int \left(\dfrac{\cos x + x \sin x}{x(x + \cos x)}\right) dx.$

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16. Verify Rolle's theorem for the function

$f(x) = x^2 + 2x - 8$ in [-4,2]

17. Solve: $\left(1 + x^2\right)\dfrac{dy}{dx} = y + \tan^{-1}x$

18. If $\overrightarrow{p}$ is a unit vector and $\left(\overrightarrow{x} - \overrightarrow{p}\right)\cdot\left(\overrightarrow{x} + \overrightarrow{p}\right) = 8$ then find $\left|\overrightarrow{x}\right|$

19. Find the intercepts made by the plane x-2y+3z-18=0 on the axes.

20. If $P(A) = \dfrac{5}{13}$, $P(B) = \dfrac{6}{13}$ and $P(A \cup B) = 7/13$ then find $P(\overline{A}/B)$ and $P(B/A)$.

21. The mean and variance of a binomial distribution are 16 and 12 respectively . Find the probability of getting 8 successes in this distribution.

22. Prove that

$$\tan^{-1}\left\{\frac{\sqrt{1+\cos x}+\sqrt{1-\cos x}}{\sqrt{1+\cos x}-\sqrt{1-\cos x}}\right\} = \frac{\pi}{4} + \frac{x}{2}$$

23. Let $A = \begin{bmatrix} 1 & 0 \\ -1 & 7 \end{bmatrix}$ and $I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ then find the K when $A^2 = 8A + KI$.

24. Show that $A = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}$ satrisfies the matrix equation $A^2 - 4A - 5I_3 = 0$

25. If α, β, γ are in A.P. then show that ,

$$\begin{vmatrix} x-3 & x-4 & x-\alpha \\ x-2 & x-3 & x-\beta \\ x-1 & x-2 & x-\gamma \end{vmatrix} = 0$$

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26. If $\sqrt{1-x^6} + \sqrt{1-y^6} = a(x^3 - y^3)$

then prove that $\dfrac{dy}{dx} = \dfrac{x^2}{y^2}\sqrt{\dfrac{1-y^6}{1-x^6}}$

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27. If $y = \left(x + \sqrt{1 + x^2}\right)^n$ then prove that $\left(1 + x^2\right)y_2 + xy_1 = n^2y.$

28. Evaluate: $\displaystyle\int \frac{dx}{1 + \tan x}$

29. Evaluate: $\displaystyle\int e^x \frac{2 - \sin 2x}{1 - \cos 2x} dx$

30. Solve: $(x + 3)\dfrac{dy}{dx} - 3y = (x + 3)^5$

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31. Solve: $y^2 dx + (xy + x^2) dy = 0$

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32. If $\vec{a} \times \vec{b} = \vec{c} \times \vec{d}$ and $\vec{a} \times \vec{c} = \vec{b} \times \vec{d}$, $\vec{a} \neq \vec{d}$, $\vec{b} \neq \vec{c}$ then

show that $\vec{b} - \vec{c}$ is parallel to $\vec{a} - \vec{d}$

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33. A and B toss a coin alternately untill one of them gets a head for the first time and wins the toss. If A begin, find the respective probability ties for A and B to win the toss.

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34. Show that the sum of the intercepts of the tangent to the curve $\sqrt{x} + \sqrt{y} = \sqrt{a}$ on the coordinate axes is constant.

35. Prove that the perpendicular distance of the line 3x+4y+5 =0 from origin is 1 unit.

36. If $\vec{a} + \vec{b} + \vec{c} = \vec{0}$ then prove that $\vec{a} \times \vec{b} = \vec{b} \times \vec{c} = \vec{c} \times \vec{a}$.