MATHS

BOOKS - UNITED BOOK HOUSE

SET 2

Exercise

1. The binary operation * define on N by a*b = a+b+ab

for all $a, b \in N$ is

    A. commutative only

B. associative only

C. commutative and associative both

D. none of these

Answer:

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2. The value of $\tan \cot^{-1}\left(-\dfrac{4}{3}\right)$ is

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

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

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

D. $-\dfrac{4}{3}$

Answer:

3. If the matrix A is both symmetric and skew symmetric then

    A. A is a diagonal matrix

    B. A is a zero matrix

    C. A is a square matrix

    D. None of these,

Answer:

4. If $f(x) = x^{\frac{3}{2}}$ then

    A. f'(0) and f"(0) both exist

    B. none of f'(0) and f"(0) exists

    C. f'(0) exists but f"(0) does not exists

    D. none of these

Answer:

5. If f(x) is an add function then $\int_{-a}^{a} f(x)dx$ is equal to

A. 0

B. $\int_{0}^{a} f(x)dx$

C. $2\int_{0}^{a} f(x)dx$

D. none of these

Answer:

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6. The value of $\int_0^\pi |\cos x|\, dx$ is

A. 0

B. 1

C. 2

D. none of these

Answer:

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7. If $\left| m \vec{a} \right| = 1$ then which of the following is true?

A. $m = \dfrac{1}{|a|}$

B. $m = \pm \dfrac{1}{|\vec{a}|}$

C. $m = \dfrac{1}{a}$

D. none of these

Answer:

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8. The lines $\dfrac{x-2}{1} = \dfrac{y-3}{1} = \dfrac{z-4}{-k}$ and $\dfrac{x-1}{k} = \dfrac{y-4}{2} = \dfrac{z-5}{1}$ are coplaner if

A. k = 1 or -1

B. k = 0 or -3

C. k = 3 or -3

D. k = 0 or -1

Answer:

9. The probability of getting 11 when an ordinary die

is thrown twice is

A. $\dfrac{1}{18}$

B. $\dfrac{1}{9}$

C. $\dfrac{1}{12}$

D. $\dfrac{5}{36}$

Answer:

10. If in a biomial distribution n=4, P(x=0) = $\dfrac{16}{81}$ then the value of P(x=4) is

A. $\dfrac{1}{16}$

B. $\dfrac{1}{81}$

C. $\dfrac{1}{27}$

D. $\dfrac{1}{8}$

Answer:

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11. Prove that , $2\tan^{-1} x = \dfrac{\cos^{-1}\left(1 - x^2\right)}{1 + x^2}$.

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12. Evaluate: $\begin{vmatrix} 1 & a & bc \\ 1 & b & ca \\ 1 & c & ab \end{vmatrix}$

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13. Show that function f(x) = 2x-|x| is continous at x=0.

14. Evaluate: $\displaystyle\int_{1}^{2} \log x \, dx$

15. Find the order of the differential equation

$$\left(\frac{d^4 y}{dx^4}\right)^3 - \frac{d^3 y}{dx^3} = \sqrt{1 + \frac{dy}{dx}}$$

16. Prove that the function $f(x) = x + \dfrac{1}{x} (x \neq 0)$ is decreasing for all x in $(- 1, 0) \cup (0, 1)$.

17. Determine the area bounded by rectangular hyperbola $xy = c^2$ the x-axis and the two ordinated x=c,x=2c.

18. The direction agnles of a straight line are $120°$, $45°$, $30°$. Is the statement true? Give reason.

19. Find K, for which the two planes x+ky+5z+2=0 and

3x-2y+kz-1=0 are perpendicular to one another.

20. Prove that, if $P(A/B) = P(A)$ then

$P(A^c/B) = P(A^c)$.

21. Find the probability of guessing correctly at least 5 of the eight answwers in a true false objective test.

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22. Solve:

$$\tan^{-1}(x-1) + \tan^{-1}x + \tan^{-1}(x+1) = \tan^{-1}3x.$$

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23. If $A = [[1, 2, 5].\,[-1, 3, -4]]$ and

$B = \begin{bmatrix} 3 & -2 & 1 \\ 0 & -1 & 4 \\ 5 & 2 & -1 \end{bmatrix}$ show that $(AB)^T = B^T A^T$

were A^T is the transpose of A.

24. If $A = \begin{bmatrix} 3 & -1 \\ 1 & 2 \end{bmatrix}$, $B = \begin{bmatrix} 3 \\ 1 \end{bmatrix}$, $C = \begin{bmatrix} 1 \\ -2 \end{bmatrix}$ find

the matrix X such that AX = 3B+2C.

25.   Prove   that

$$\begin{bmatrix} a^2 & bc & c^2 + ca \\ a^2 + ab & b^2 & ca \\ ab & b^2 + bc & c^2 \end{bmatrix} = 4a^2 b^2 c^2.$$

26. If $x^2 + y^2 = t - \dfrac{1}{t}$ and $x^4 + y^4 = t^2 + \dfrac{1}{t^2}$, show that , $x^3 y \dfrac{dy}{dx} = 1$.

27. If $2x = y^{\frac{1}{5}} + y^{-\frac{1}{5}}$ prove that $(x^2 - 1)y_2 + xy_1 = 25y$

28. Solve: $(2x + 4y + 3)\dfrac{dy}{dx} = 2y + x + 1$

29. Solve: $x\left(1 - x^2\right)dy + \left(2x^2y - y - 5x^3\right)dx = 0.$

30. If the magnitude of difference of two unit vectors is $\sqrt{3}$, then show that the sum of the vectors is also a unit vector.

31. If the vector $a\hat{i} + a\hat{j} + c\hat{k}, \hat{i} + \hat{k}$ and $c\hat{i} + c\hat{j} + b\hat{k}$ be coplanar, show that $c^2 = ab.$

32. Evaluate :

$$\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} [f(x) + f(-x)][g(x) + g(-x)]dx$$

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33. Using the definition of difinite integral as the limit of sum , evaluate $\int_{a}^{b} 2^x dx$.

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34. There are three coins, One is two headed coin, another is a biased coin that comes up head 75% of the time and thrid is an unbaised coin. One of the three coins is chosen at random and tossed. If its hows head, what is the probability that it was the two headed coin?

35. If X follows a binomial distribution with mean 3 and variance $\dfrac{3}{2}$ find and P$(X \leq 5)$.

36. A 5 ft long man walks away from the foot of a $12\dfrac{1}{2}$ ft high lamp post at the rate of 3 mile/h. Find the rate at which his shadow is increasing.

37. Mark the area bounded by the curves $y^2 = 4x$ and $x^2 = 4y$ and find the marked area.