MATHS

BOOKS - UNITED BOOK HOUSE

SET 14

Exercise

1. The mapping $f: A \to B$ is invertible if it is

A. injective

B. surjective

C. bijective

D. none of these.

Answer:

Watch Video Solution

2. If $\sec^{-1} x = \operatorname{cosec}^{-1} y$ state which of the following is the value of $\left(\cos^{-1}\left(\frac{1}{x}\right) + \cos^{-1}\left(\frac{1}{y}\right)\right)$?

A. π

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

C. $\frac{5\pi}{3}$

D. $\frac{\pi}{2}$

Answer:

Watch Video Solution

3. If $A = [a_{ij}]$ is a 2×2 matrix such that $a_{ij} = i + 2j$, then A will be

A. $\begin{bmatrix} 1 & 3 \\ 2 & 4 \end{bmatrix}$

B. $\begin{bmatrix} 2 & 4 \\ 3 & 5 \end{bmatrix}$

C. $\begin{bmatrix} 3 & 5 \\ 4 & 6 \end{bmatrix}$

D. none of these.

Answer:

Watch Video Solution

4. The greatest integer fuction f(x) = [x] is

A. continuous for all real values of x

B. continuous only at non integral values of x

C. continuous at intgral values of x

D. none of these.

Answer:

Watch Video Solution

5. The value of $\int e^{5\log x}dx$ is

A. $\frac{e^{5\log x}}{5}+c$

B. $\frac{e^{5\log x}}{5\log x}+c$

C. $\frac{x^5}{5}+c$

D. $\frac{x^6}{6}+c$

Answer:

Watch Video Solution

6. The slope of the tangent to the curve xy=c^2 at $\left(ct, \frac{c}{t}\right)$ is

A. $-\frac{1}{t}$

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

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

D. $\frac{1}{t^2}$

Answer:

Watch Video Solution

7. $\hat{i} + 2\hat{j}$ and $-\hat{i} + m\hat{j}$ are given as collinear vectors, then the value of m is

A. 2

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

C. -2

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

Answer:

Watch Video Solution

8. The line joining the points (1,1,2) and (3,-2,1)meets the plane 3x + 2y + z = 6 is

A. (-3,-2,1)

B. (3,-2,1)

C. (-3,2,1)

D. (3,2,1)

Answer:

Watch Video Solution

9. If the odds in favour of an event are $9:4$, then its probability of occurrence is

A. $\frac{9}{13}$

B. $\frac{4}{13}$

C. $\frac{4}{9}$

D. $\frac{5}{13}$

Answer:

Watch Video Solution

10. The S.D. of a binomial distribution with parameteres n and p is

A. np

B. $\sqrt{np}$

C. $\sqrt{(np)(1-p)}$

D. $2\sqrt{np}$

Answer:

Watch Video Solution

11. Let $S = N \times N$and $*$ is a binary operation on S defined by $(a, b)^*(c, d)$ = (a+c, b+d) for all $a, b, c, d \in N$.Prove that $*$ is an associate binary operation on S.

Watch Video Solution

12. Prove that, $2\sin^{-1}x = \sin^{-1}\left(2x\sqrt{1-x^2}\right)$

Watch Video Solution

13. prove without expanding, $\begin{vmatrix} (a-b) & 1 & a \\ b-c & 1 & b \\ c-a & 1 & c \end{vmatrix} = \begin{vmatrix} a & 1 & b \\ b & 1 & c \\ c & 1 & a \end{vmatrix}$

Watch Video Solution

14. If two matrices A and B of orders $2 \times m$ and $3 \times n$ respectively are conformable for the product AB of order $p \times 4$, find the values of m, n and p.

Watch Video Solution

15. Evaluate: $\lim_{x \to 0} \frac{\log(1+\alpha x)}{\sin \beta x}$

Watch Video Solution

16. If $y = \log_x \tan x$, find $\frac{dy}{dx}$.

Watch Video Solution

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

Watch Video Solution

18. Form the diffential equation of family of parabolas having vertex at the origin and axis along positive y-axis.

Watch Video Solution

19. If f(x) = $(x-1)e^x + 1$, show that f(x) is positive for all positive values of x.

Watch Video Solution

20. Using direction ratios show that the points (2,6,3),(1,2,7) and (3,10,-1) are collinear.

Watch Video Solution

21. Find the equation of the plane which passing through the point $\hat{i}+\hat{j}+\hat{k}$ and parallel to the plane $\vec{r}.\left(2\hat{i}-\hat{j}+2\hat{k}\right)$ = 0.

Watch Video Solution

22. For three mutually exclusive events X,Y and Z it is given that P(x) = 2P(Y) = 3P(Z) and XUYUZ = s, where S denotes sure events, find the value of P(X).

Watch Video Solution

23. A discrete random variable X has the following distribution:

X	−1	0	1	2	3	4	5	6
p(x)	0·1	a	· 2a	0·2	3a	4a	0·2	5a

find a.

Watch Video Solution

24. If xy = $1 + a^2$ then show that,

$$\tan^{-1}\left[\frac{1}{a+x}\right] + \tan^{-1}\left[\frac{1}{a+y}\right] = \tan^{-1}\left[\frac{1}{a}\right], x + y + 2a \neq 0.$$

Watch Video Solution

25. By using properties of determinants. Show that:

$$\left|1 + a^2 - b^2; 2ab; \ -2b : 2ab; 1 - a^2 + b^2; 2a : 2b; \ -2a; 1 - a^2 - b^2\right| = (1 -$$

Watch Video Solution

26. If $y = f(x^2)$ and $f'(x) = \sqrt{3x^2 + 1}$, find $\left[\frac{dy}{dx}\right]_{x=2}$

Watch Video Solution

27. If $y = \left(\tan^{-1} x\right)^2$, then show that $\left(1 + x^2\right)^2 \frac{d^2y}{dx^2} + 2x\left(1 + x^2\right)\frac{dy}{dx} = 2.$

Watch Video Solution

28. Prove that, $\int \frac{\cos 5x + \cos 4x}{1 - 2\cos 3x} dx = -\left(\frac{1}{2}\sin 2x + \sin x\right) + c$

Watch Video Solution

29. Solve: $\frac{dy}{dx} = \frac{3x + 4y + 1}{-4x + 2y - 3}$

Watch Video Solution

30. Solve: $(x^2-1)\frac{dy}{dx}+2xy=\frac{2}{x^2-1}$

Watch Video Solution

31. $\vec{a}=\hat{i}+\hat{j}+\hat{k}$ and $\vec{b}=-2\hat{i}+\hat{j}+2\hat{k}$ represent two adjacent sides of a parallelogram. Find unit vectors in directions parallel to the diagonals of the parallelogram.

Watch Video Solution

32. Find the vector α which is perpendicular to both $4\hat{i}+5\hat{j}-\hat{k}$ and $\hat{i}-4\hat{j}+5\hat{k}$ and which satisfies the relation $\alpha.\beta$ = 21 where $\beta=3\hat{i}+5\hat{j}-\hat{k}$.

Watch Video Solution

33. Show that: $\int_0^1\left(\frac{\log(1+x)}{1+x^2}\right)dx=\frac{\pi}{8}\log 2.$

Watch Video Solution

34. Evaluate:

$$\lim_{n\to\infty} \frac{1}{n}\left[\sin\left(\frac{\pi}{2n}\right)+\sin\left(\frac{2\pi}{2n}\right)+\sin\left(\frac{3\pi}{2n}\right)+\ldots\ldots+\sin\left(\frac{n\pi}{2n}\right)\right]$$

Watch Video Solution

35. A random variable X has the following probability function:

x	−2	−1	0	1	2	3
p(x)	0·1	k	0·2	2k	0·3	3k

Calculated K.

Watch Video Solution

36. A random variable X has the following probability function:

x	−2	−1	0	1	2	3
p(x)	0·1	k	0·2	2k	0·3	3k

Find $P(x < 2), P(x \geq 2), P(-2 < x \leq 2)$

Watch Video Solution

37. A random variable X has the following probability function:

x	−2	−1	0	1	2	3
p(x)	0·1	k	0·2	2k	0·3	3k

Calculate the minimum value of K.such that $P(x \leq 1) > 0.36$.

Watch Video Solution

38. Show that the maximum value of $2x + \frac{1}{2x}$ is less than its minimum value.

Watch Video Solution

39. answer any one question : (ii) find the equation of the line which is perpendicular to both of the lines

$\frac{x}{2} = \frac{y}{1} = \frac{z}{3}$ and $\frac{x-3}{-1} = \frac{y-2}{3} = \frac{z+5}{5}$ and passing through the point (1,2,3)

Watch Video Solution