



MATHS

BOOKS - UNITED BOOK HOUSE

SET 9

Exercise

1. Total number of relations that can be defined on set A = {1,2,3,4} is

- A. 2^4
- $\mathsf{B.}\,2^8$
- $\mathsf{C}.\,2^{12}$
- $\mathsf{D.}\,2^{16}$

Answer:

2. Which of the following is the value of $\cot\left(\cos ec^{-1}2 + \cos^{-1}\left(\frac{1}{2}\right)\right)$?

A. 1

- B. 0
- C. -1

D. $\sqrt{3}$

Answer:

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3. if A be a symmetric matrix then A^n will be

A. symmetric

B. skeq symmetric

C. square matrix

D. scalar matrix

Answer:



4. The value of
$$\int \sin x^\circ dx$$
 is

A.
$$\frac{\pi}{180} \cos x^{\circ} + c$$

B. $\frac{180}{\pi} \cos x^{\circ} + C$
C. $-\frac{180}{\pi} \cos x^{\circ} + c$
D. $-\frac{\pi}{180} \cos x^{\circ} + C$

Answer:

5. The slope of the normal to rectangular hyperbopla xy= 4 at $\left(2t, \frac{2}{t}\right)$ is a) $-t^2$ b) t^2 c) 2t d)-2t

A. $-t^2$ B. t^2

C. 2t

D. - 2t

Answer:

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6. The direction ratios of the line parallel to the line $\frac{x-1}{3} = \frac{y-5}{1} = \frac{z-3}{0}$ are proportional to A. 3,1,0 B. 3,-1,0

C. 1,5,3

D. -3, 1, 0

Answer:



7. A number is chosen at from the first 11 natural number, then the probability that the chosen number is even is

A.
$$\frac{6}{11}$$

B. $\frac{5}{6}$
C. $\frac{4}{11}$
D. $\frac{5}{11}$

Answer:

8. The mean of the binomial distribution with parameters n and p is

A. np

B. n(1-p)

C. (n+1)p

D. (n-1)p

Answer:

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9. Prove that $\sin \cos ec^{-1} \cot \left(an^{-1} x
ight) = x$

10. Prove without expanding
$$\begin{vmatrix} a & a^2 & bc \\ b & b^2 & ca \\ c & c^2 & ab \end{vmatrix} = \begin{vmatrix} 1 & a^2 & a^3 \\ 1 & b^2 & b^3 \\ 1 & c^2 & c^3 \end{vmatrix}$$

11. Find the matrix A , when
$$A^{-1} = \begin{bmatrix} \cos \theta & \sin \theta \\ -\sin \theta & \cos \theta \end{bmatrix}$$

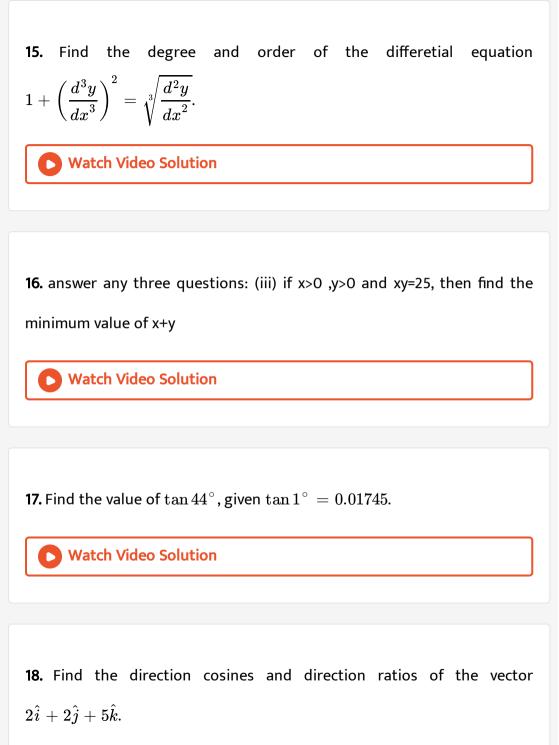
12. Evaluate : Lt
$$x \to e \frac{\log x - 1}{x - e}$$

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13. Examine whether Rolle's theorem is applicable to the function $f(x)=\cot x$ in $-rac{\pi}{2}\leq x\leq rac{\pi}{2}$

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14.
$$\int \left(rac{x^2 + \sin^2 x}{1 + x^2}
ight) \mathrm{sec}^2 \, x dx$$
 is equals



19. The cartesian equation of a line AB is $\frac{3-x}{1} = \frac{y+2}{-2} = \frac{z-5}{4}$. Find

the direction ratios of a line parallel to AB.

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20. If
$$Pig(\overline{A}\cup\overline{B}ig)=rac{5}{6}, P(A)=rac{1}{2}$$
 and $Pig(\overline{B}ig)=rac{2}{3}$ show that A and B

are two independent events.

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21. Find the probability that in a family of 4 children there will be at least

one boy. (Assume that the probability of a male child is $\frac{1}{2}$)

22. answer any one question : (ii) prove that ,

$$\tan\left(\frac{\pi}{4} + \frac{1}{2}\left(\cos^{-1}\left(\frac{a}{b}\right)\right) + \tan\left(\frac{\pi}{4} - \frac{1}{2}\left(\cos^{-1}\left(\frac{a}{b}\right)\right) = \frac{2b}{a}.$$

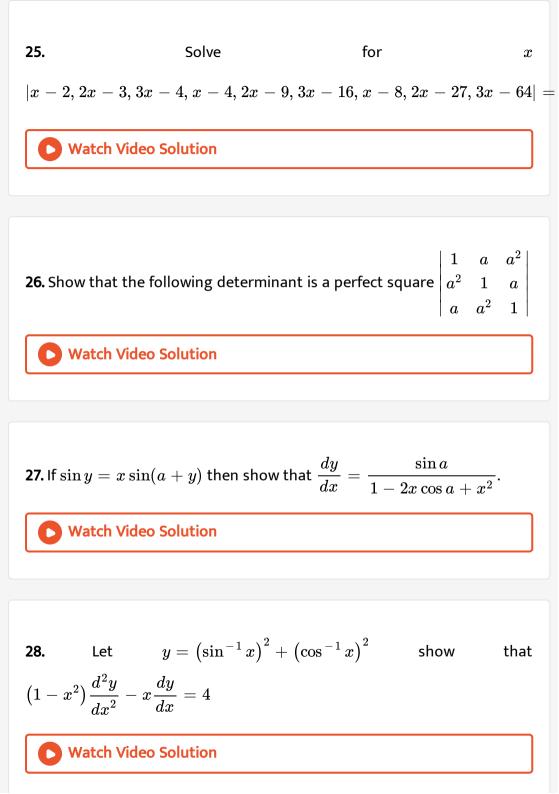
23. If
$$A = \begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$$
, $I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ and $O = \begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$ show that $A^2 - 5A + 7I = 0$. Hence find A^{-1} .

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24. Show that,
$$A = rac{1}{3} \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & -1 \\ -2 & 2 & -1 \end{bmatrix}$$

are orthogonal matrix and hence

find A^{-1} .



29. Evaluate:
$$\int \frac{dx}{1+x^3}$$
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30. Evaluate:
$$\int \frac{x^2 dx}{x^4 - x^2 + 1}.$$

31. Solve:
$$xdx + ydy + \frac{xdy - ydx}{x^2 + y^2}$$
=0 given y = 1 when x= 1.

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32. Solve: (x+tany)dy = sin 2y dx.

33. D,E,F are the midpoints of the sides \overline{BC} , \overline{CA} and \overline{AB} respectively of the triangle ABC. If P is any point in the plane of the triangle , show that $\overline{PA} + \overline{PB} + \overline{PC} = \overline{PD} + \overline{PE} + \overline{PF}$.



34. The dot product of a vector with the vectors $\hat{i} - 3\hat{k}$, $\hat{i} - 2\hat{k}$ and $\hat{i} + \hat{j} + 4\hat{k}$ are 0,5,8 respectively. Find the vector.

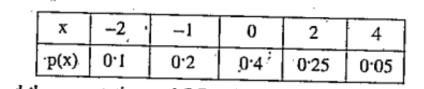
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35. Evalute:
$$\int\limits_{0}^{\pi/2} rac{\sin^{3/2}x}{\sin^{3/2}x + \cos^{3/2}x} dx$$

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36. The probability distribution of a discrete random varible X is as

follows:



Find the expectation and S.D. of .X.

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37. A ballong leaves the ground 50 ft from an observer. If it rises vertically at the rate of 6 ft/s how fast is it reducing form the point of observation when it is 120 ft above the ground?



38. A particle moves in a straight line such that its distance x from a fixed point on it at any time t is given by $x = \frac{1}{4}t^4 - 2t^3 + 4t^2 - 7$. Find the time its velocity is maximum and the time when its acceleration is minimum.

39. Find the area of the region $ig\{(x,y)\!:\!y^2\leq 4x, 4x^2+4y^2\leq 9ig\}$



40. Find the shortest distance between the lines

$$rac{x-1}{2} = rac{y-2}{3} = rac{z-3}{4}$$
 and $rac{x}{2} = rac{y-5}{3} = rac{z+1}{4}$

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41. Find the distance between the point P(6,5,9) and the plane passing

through A(3,-1,2),B(5,2,4) and C(-1,-1,6).

