



MATHS

BOOKS - UNITED BOOK HOUSE

QUESTION PAPER 2015



1. The value of m for which the planes 2x+3y-z=5 and

3x-my+3z=6 are perpendicular to each other is

A.-1

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

C. `1

 $\mathsf{D}.\,\frac{1}{2}$

Answer:



2.
$$f(x) = \mu x - \sin x$$
, x>0 is a monotonic increasing

funcrtion then

A.
$$\mu > -1$$

B. $\mu < 1$

 $\mathsf{C}.\,\mu>1$

D. $\mu \leftarrow 1$

Answer:

Watch Video Solution

3. The probability distribution P(x) of a random

variable X is given by
$$p(X=x)= egin{cases} K & whenx=0\ 2K & whenx=1\ 3K & whenx=2\ 0 & elsewhere \end{cases}$$
, where K is a

constant. The value of K is

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

B.
$$\frac{1}{4}$$

C. $\frac{1}{5}$
D. $\frac{1}{6}$

Answer:



4. IF
$$P(A \cap B) = \frac{5}{13}$$
 then the value of $P\left(A^C \cup B^C\right)$ is
A. $\frac{4}{13}$
B. $\frac{5}{13}$

C.
$$\frac{7}{13}$$

D. $\frac{8}{13}$

Answer:

Watch Video Solution

5. The value of λ for which the vectors $\overrightarrow{a} = \hat{i} + 3\hat{j} - \hat{k}$ and $\overrightarrow{b} = 2\hat{i} + 6\hat{j} + \lambda k$ are parallel is

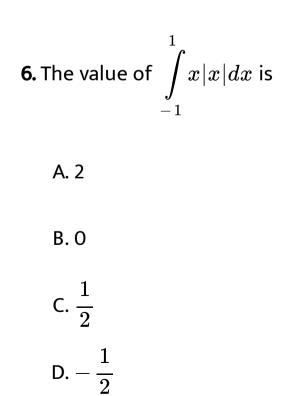
$$\mathsf{B.}-\frac{1}{2}$$

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

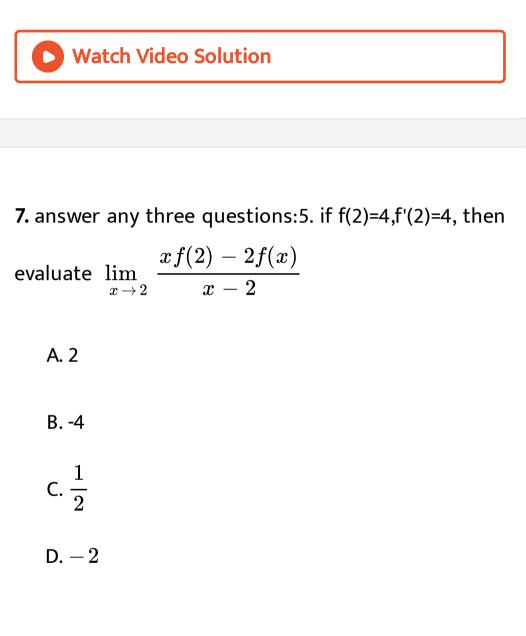
D.-2

Answer:





Answer:



Answer:



8. If A is a 2 imes 2 invertible matrix, then value of det A^{-1} is

A. $-\det A$ B. $-\frac{1}{\det A}$ C. det A D. $\frac{1}{\det A}$

Answer:

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

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

B. $-\frac{\pi}{6}$
C. $\frac{\pi}{4}$
D. $-\frac{\pi}{4}$

Answer:



10. The relation R {(1,1),(2,2),(4,4),(1,2),(1,3),(2,3)} on the

set A = {1,2,3,4} is

A. reflexive

B. symmetric

C. transitive

D. equivalence

Answer:

Watch Video Solution

11. A binary operation * is defined on the set of all integers Z by a * b=a+b+5, $a, b \in Z$ Find whether * is

associative on Z.

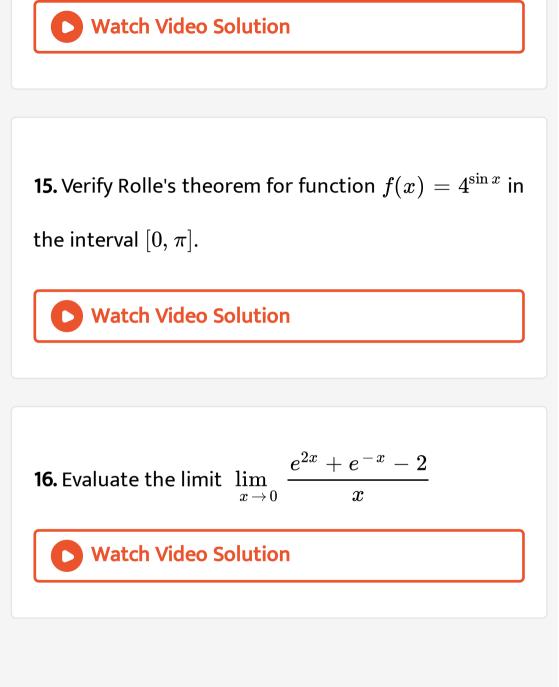
12. Find the value of $\tan^{-1}\left\{2\cos\left(2\frac{\sin^{-1}1}{2}\right)\right\}$.

(Consider principal values only).

Watch Video Solution

13. If
$$A=egin{pmatrix} 3 & 1 \ 7 & 5 \end{pmatrix}$$
 and $A^2=-xl+yA.$ Find x

and y where I is a unit matric of order 2.



17. If the function $f(x)= egin{cases} rac{\sin x}{kx}+k & x
eq 0 \ 2 & x=0 \end{cases}$ is

continuous at x = 0, find k.

Watch Video Solution

18. If
$$\sin^{-1}\left(\frac{x^2-y^2}{x^2+y^2}\right)=k$$
, k is a constant, then prove that $\frac{dy}{dx}=\frac{y}{x}$.

Watch Video Solution

19. Evaluate the
$$\int \sin \sqrt{x} dx$$

20. Find the differential equation of the curves given by $y = Ae^{2x} + Be^{-2x}$ where A and B are

parameters.

Watch Video Solution

21. Find the vector equation of the line whose

Cartesian equation is given by x+y+z=0.



22. If \overrightarrow{a} and \overrightarrow{b} are two vectors such that $\left|\overrightarrow{a}\right| = 2$, $\left|\overrightarrow{b}\right| = 3$ and $\overrightarrow{a} \cdot \overrightarrow{b} = 4$, then find the value of $\left|\overrightarrow{a} - \overrightarrow{b}\right|$

Watch Video Solution

23. Find out the mean and variance of the following

probability distribution:

X = x_i
 0.
 1.

 p_i

$$\frac{1}{2}$$
 $\frac{1}{2}$

where

$$p_i = P(X = x_1)$$

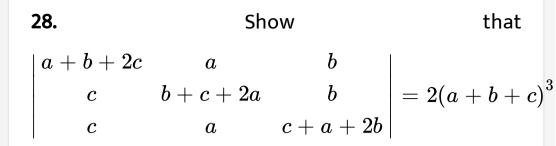
24. Find the probability that birthdays of any two members out of five members in a family fall on Sunday.



25. Prove that
$$\tan^{-1}\left(\frac{1}{x+y}\right) + \tan^{-1}\left(\frac{y}{x^2+xy+1}\right) = \cot^{-1}x$$

26. If
$$A = \begin{pmatrix} 1 & 4 \\ 2 & 3 \end{pmatrix}$$
 then show that $A^2 - 4A - 5I = \theta$ and using this find A^{-1} . Where $I = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$ and $\theta = \begin{pmatrix} 0 & 0 \\ 0 & 0 \end{pmatrix}$. Watch Video Solution

27. Solve the following equations by Cramer's method: x+y=1,y+z= 2,x+z=3.



Watch Video Solution

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

30. Find
$$\frac{dy}{dx}$$
 where
 $x = \cos^{-1}(8t^4 - 8t^2 + 1)$
`y = sin^(-1)(3t-4t)^3,[0

Watch Video Solution

31. Evaluate:
$$\int rac{2^x dx}{\sqrt{4^x-2^{x+2}+5}}$$

Watch Video Solution

32. Evaluate :
$$\int rac{3x+5}{x^3-x^2-x+1} dx$$

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

Watch Video Solution

34. If the rate of increase of population is 5% per year, then in how many years the population will be doubled?



35. Find \overrightarrow{c} , when $\overrightarrow{a} \times \overrightarrow{c} = \overrightarrow{b}$ and $\overrightarrow{a} \cdot \overrightarrow{c} = 3$ where $\overrightarrow{a} = \hat{r} + \hat{j} + \hat{k}$ and $\overrightarrow{b} = \hat{j} - \hat{k}$.

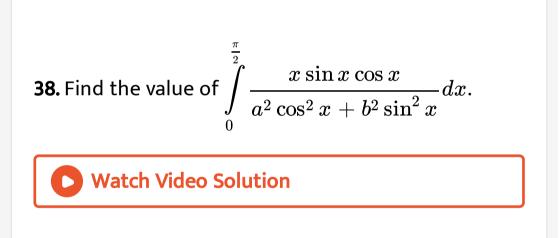
Watch Video Solution

36. Find the value of
$$\lambda$$
 if three vectors
 $\overrightarrow{a} = 2\hat{i} - \hat{j} + \hat{k}, \overrightarrow{b} = \hat{i} + 2\hat{j} - 3\hat{k}$ and
 $\overrightarrow{c} = 3\hat{i} + \lambda j + 5\hat{k}$ are coplanar.

37. Evaluate (with the help of definite integral)

$$\lim_{n \to \infty} \left[\frac{1}{\sqrt{n}} + \frac{1}{\sqrt{2n}} + \frac{1}{\sqrt{3n}} + \dots + \frac{1}{n} \right]$$

Watch Video Solution

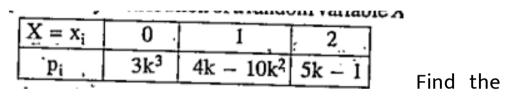


39. Sum and product of mean and standard deviation of a bionomial distribution are 24 and 128 respectively. Find the distribution.

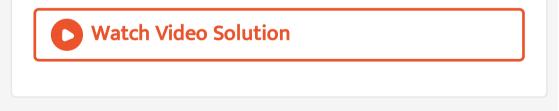


40. The probability distribution of a random variable

X is given as follows:



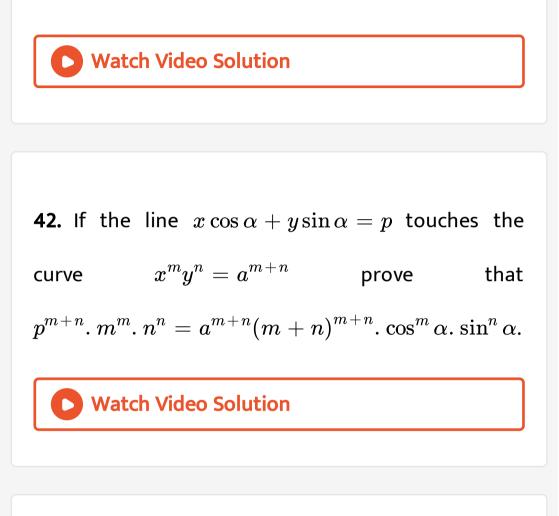
value of k.



41. A lamp is on the top of a lamp post of height 2a metres situated on a straight road. A boy of height a metre walks towards the post at the speed of c

metre/minute. Find the rate of decrease of the lengh

of his shadow.



43. The total surface area of a right circular cone is given. Show that the volume of that cone will be

maximum if the semivertical angle is $\frac{\sin^{-1} 1}{3}$.

Watch Video Solution

44. Find the image of the point (1,6,3) with respect to the line $\frac{x}{1} = \frac{y-1}{2} = \frac{z-2}{3}$ and also find the equation of the line passing through the point and its image.

Watch Video Solution

45. Find the equation of a plane through the intersection of the planes \overrightarrow{r} . $\left(\hat{i}+3\hat{j}-\hat{k}
ight)=5$ and

$$\overrightarrow{r}.\left(2\hat{i}-\hat{j}+\hat{k}
ight)=3$$
 and passing through the

point (2,1,-2)

