



MATHS

BOOKS - JEEVITH PUBLICATIONS MATHS (KANNADA ENGLISH)

MODEL QUESTION PAPER 1

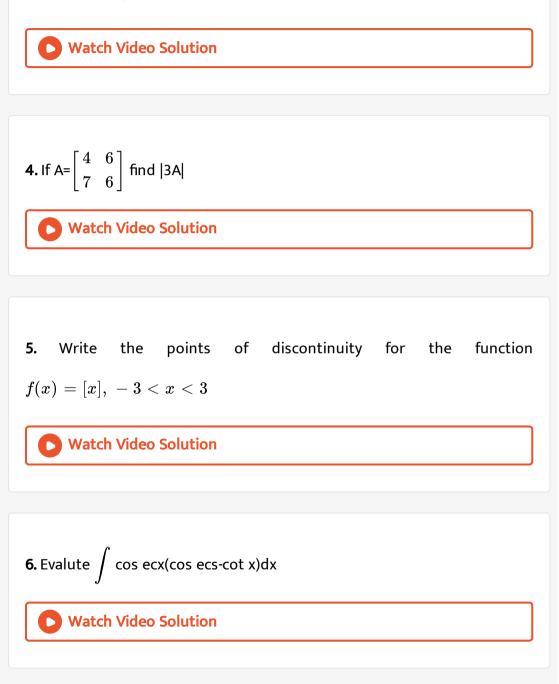


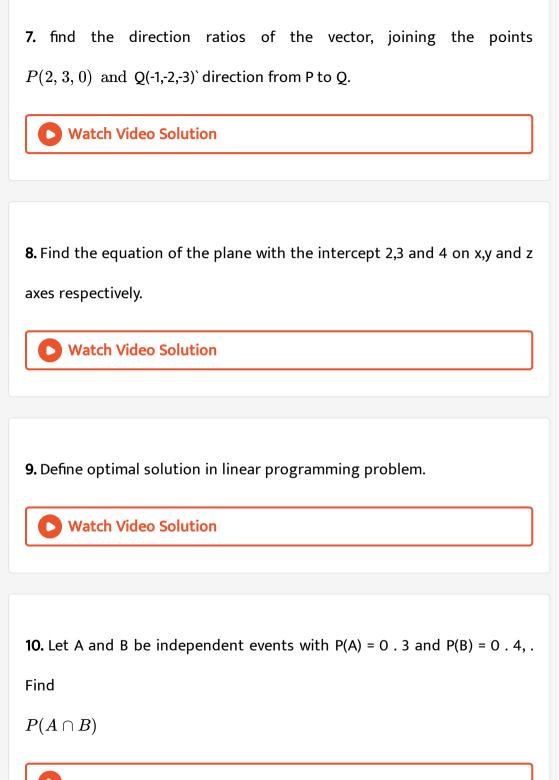
1. The operation * defined a * b = a. Is * a binary operation on z.

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2. Write the range of the principal value branch of the function $y = \sin^{-1} x$

3. Define a diagonal matrix.





Part B

1. Find gof and fog given
$$f(x) = 8x^3$$
 and $g(x) = x^{1/3}$.

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2. Write the following in the simplest form of
$$\tan^{-1}\left(\frac{\cos x - \sin x}{\cos x + \sin x}\right), 0 < x < \frac{\pi}{2}$$

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3. Prove that
$$2\sin^{-1}\left(rac{3}{5}
ight)= an^{-1}\left(rac{24}{1}
ight)$$

4. Find the area of a triangle whose vertices are (1,3), (2,5) and (7,5) using

determinants



5. Find
$$rac{dy}{dx}, \hspace{1em} ext{if} \hspace{1em} 2x+3y=\sin y$$

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6. If
$$x=at^2$$
, y=2at show that $\displaystyle rac{dy}{dx}=\displaystyle rac{1}{t}$

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7. Find the approximate change in the volume V of a cube of side x meters

caused by increasing side by 2%.



8. Evalute:
$$\int \sin^3 x dx$$



$$\mathbf{9.}\int_{0}^{\pi/2}\cos 2xdx.$$

D

10. Find the order and degree of the differential equation, $\left(\frac{ds}{dt}\right)^4 + 3s\frac{d^2s}{dt^2} = 0$ Watch Video Solution

11. Find a vector in the direction of the vector $\overrightarrow{a}=2\hat{i}+3\hat{j}+\hat{k}$ that has

magnitude 7 units.

12. If $\hat{a} = 5\hat{i} - \hat{j} - 3\hat{K}$ and $\overrightarrow{b} = \hat{i} + 3\hat{j} - 5\hat{k}$, then show that the vectors $\overrightarrow{a} + \overrightarrow{b}$ and $\overrightarrow{a} - \overrightarrow{b}$ are perpendicular.

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13. Find the vector equation of the line, passing through the points (-1,0,2)

and (3,4,6)

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14. Two coins are tossed once, where

E : no tail appears F : no head appears

Find P(E/F)





1. Prove that the relation R defined on the set of real numbers R as $R = \left\{(a,b): a \le b^2 \, orall a, b \in R
ight\}$ is neither reflexive nor symmetric nor transitive.

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2. Prove that
$$an^{-1}x + an^{-1}rac{2x}{1-x^2} = an^{-1}igg[rac{3x=x^3}{1-3x^2}igg], |x| < rac{1}{\sqrt{3}}$$

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3. Find the values of x, y and z in the following matrices. $\begin{pmatrix} x+y & 2 \\ 5+z & xy \end{pmatrix} = \begin{pmatrix} 6 & 2 \\ 5 & 8 \end{pmatrix}$

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4. Differentiate
$$\sqrt{rac{(x-1)(x-2)}{(x-3)(x-4)}}$$
 with respect to x

5. If
$$y = \sin^{-1} \left[rac{2^{x+1}}{1+4^x}
ight]$$
 find $rac{dy}{dx}$.

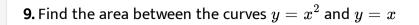
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6. Find the intervals in which the function f given by
$$f(x) = 2x^3 - 3x^2 - 36x + 7$$
 is

(a) strictly increasing (b) strictly decreasing?

7. Evalute:
$$\int \frac{\left(1+\log x\right)^2}{x} dx$$

8. Evaluate
$$\int \frac{x \cos^{-1} x}{\sqrt{1-x^2} dx}$$





10. Form the differential equation representing the family of curves $y = a \sin(x + b)$ where a,b are arbitrary constant.

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11. Find the area of a triangle having the points A(1,1,1)B(1,2,3) and C(2,3,1)

as its vertices.

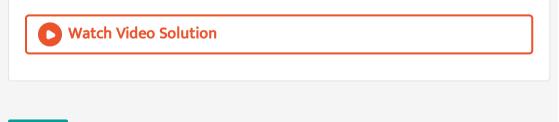


12. Prove that
$$\begin{bmatrix} \overrightarrow{a}, \overrightarrow{b}, \overrightarrow{c} + \overrightarrow{d} \end{bmatrix} = \begin{bmatrix} \overrightarrow{a}, \overrightarrow{b}, \overrightarrow{c} \end{bmatrix} + \begin{bmatrix} \overrightarrow{a}, \overrightarrow{b}, \overrightarrow{d} \end{bmatrix}$$
.

13. Find the distance between the parallel lines

$$\vec{r} = \hat{i} + 2\hat{j} - 4\hat{k} + m\left(2\hat{i} + 3\hat{j} + 6\hat{k}\right)$$
 and $\vec{r} = 3\hat{i} + 3\hat{j} - 5\hat{k} + n\left(2\hat{i} + 6\hat{k}\right)$
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14. Two cards are drawn successfully with replacement from a wellshuffled pack of 52 cards. Find the probability distribution of number of aces.



Part D

1. Let $f \colon N o R$ be defined by $f(x) = 4x^2 + 12x + 15$, show that

 $f\colon N o S$, where S is the range of f, is invertible. Also find the inverse.

if
$$A = \begin{pmatrix} 0 & 6 & 7 \\ -6 & 0 & 8 \\ 7 & -8 & 0 \end{pmatrix}$$
, $B = \begin{pmatrix} 0 & 1 & 1 \\ 1 & 0 & 2 \\ 1 & 2 & 0 \end{pmatrix}$ and $C = \begin{pmatrix} 2 \\ -2 \\ 3 \end{pmatrix}$

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3. Solve the following system of linear equations by matrix method.

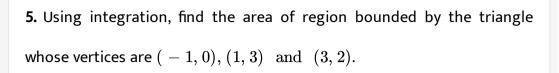
x-y+2z=7

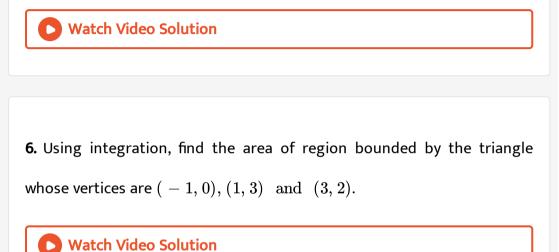
3x+4y-5z=-5

2x-y+3z=12

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4. Find the integral of $\sqrt{x^2 + a^2}$ w.r.t. x and hence evaluate $\int \sqrt{x^2 + 4x + 6}$, dx.





7. Find the general solution of the differential equation
$$ydx - (x + 2y^2)dy = 0$$

8. Derive the equation of a plane perpendicular to a given vector and passing through a given point in both vector form and Cartesian form.

9. There are 5% defective items in a large bulk of items. What is the probability that a sample of 10 items will include not more than 1 defective item.

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Part E

1. Prove that
$$\int_0^{2a} f(x)dx = 2\int_0^a f(x)dx$$
 when $f(2a-x) = f(x)$ and hence evaluate $\int_0^\pi |\cos x| dx.$

2. Minimize Z = 3x + 2y, subject to constraints are $x + 2y \le 10, 3x + y \le 15$, and $x, y \ge 0$. Watch Video Solution
3. Find the relationship between a and b so that the function defined by

 $f(x) = egin{cases} ax+1 & ext{if} & x\leq 3\ bx+3 & ext{if} & x>3 \end{cases}$ is continuous at x = 3.