

## MATHS

# BOOKS - JEEVITH PUBLICATIONS MATHS (KANNADA ENGLISH)

### **ANNUAL EXAMINATION QUESTION PAPER JUN-2017**

1. Find the identify element for the binary operation \*, defined on the

set of Q of rational number, by  $a \cdot b = rac{ab}{4}$ 



1. Write the values of x for which  $an^{-1} rac{1}{x} = \cot^{-1} x$ , holds.

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**2.** Construct a 2 imes 2 matrix,  $A=ig[a_{ij}ig]$ , whose elements are given by .



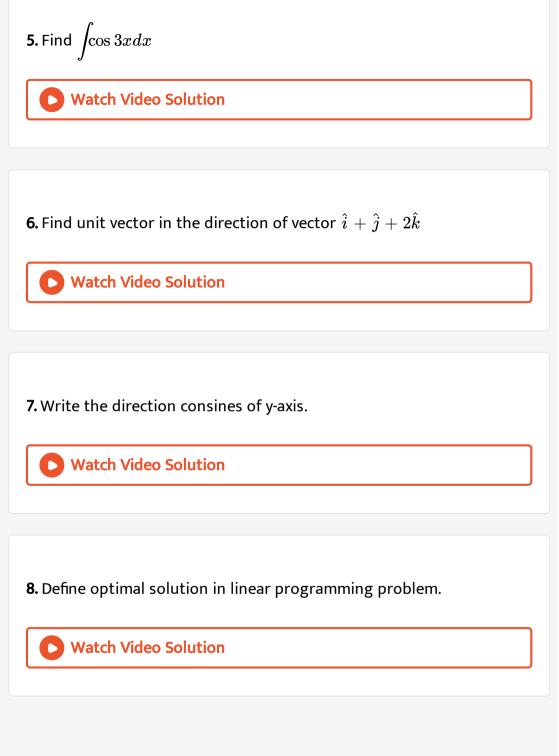
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**3.** Find the value of x for which

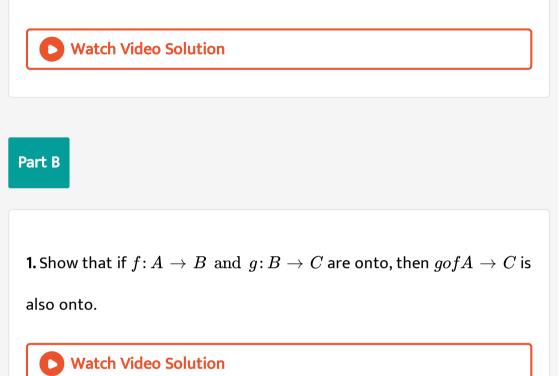
$$egin{array}{c|c} 3 & x \ x & 1 \end{array} = egin{array}{c|c} 3 & 2 \ 4 & 1 \end{array}$$

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**4.** Find 
$$rac{dy}{dx}$$
 if y  $=$  sin $(x^2)$ 

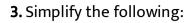


**9.** If P(A) = 0.8 and P(B/A) = 0.4 then find  $P(A \cap B)$ 



2. Prove the following:

$$2 an^{-1}x = \cos^{-1}igg(rac{1-x^2}{1+x^2}igg), x \ge 0$$



$$\sin^{-1}\left(\sin\frac{3\pi}{5}\right)$$



**4.** Using determinant method, find the area of the triangle whose vertices are (1,0),(6,0) and (4,3).

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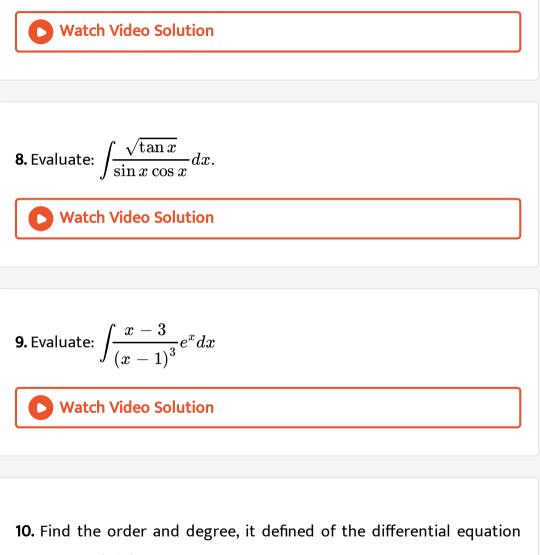
**5.** Differentiate  $(\sin x)^x$  with respect to x.

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**6.** Find 
$$rac{dy}{dx}, ext{ if } 2x+3y=\sin y$$

7. Find the point on the curve  $rac{x^2}{4}+rac{y^2}{25}=1$  at which the tangents

are parallel to x-axis.



$$rac{d^4y}{dx^4}+rac{\sin(d^3y)}{dx^3}=0$$



11. If 
$$\overrightarrow{a}$$
 is a unit vector and  $\left(\overrightarrow{x}-\overrightarrow{a}\right)$ .  $\left(\overrightarrow{x}+\overrightarrow{a}\right)=8$ , then find  $\left|\overrightarrow{x}\right|$ 

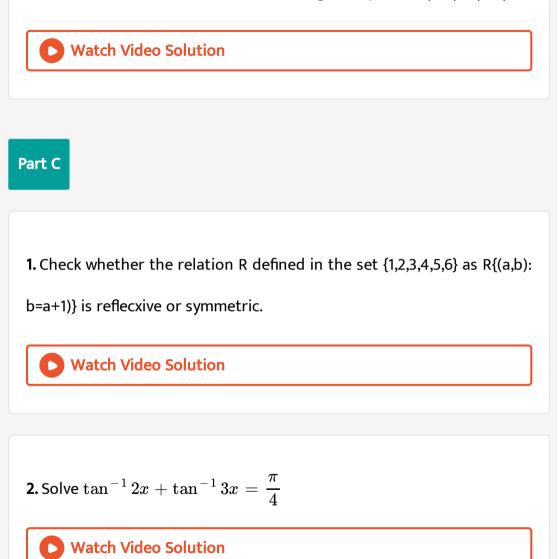
12. Find the area of the parallelogram whose adjacent sides are given by the vectors  $\overrightarrow{a} = 3\hat{i} + \hat{j} + 4\hat{k}$  and  $b = \hat{i} - \hat{j} + \hat{k}$ .

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**13.** Find the angle between the pair of lines given by  $\vec{r} = 2\hat{i} - 5\hat{j} + \hat{k} + \lambda \left(3\hat{i} + 2\hat{j} + 6\hat{k}\right), \vec{r} = 7\hat{i} - 6\hat{k} + \mu \left(\hat{i} + 2\hat{j} + 2\hat{k}\right)$ 

14. If A and B are two adjacent events, then prove that the probability

of occurance of atleast one of A and B is given by 1 - P(A')P(B')



**3.** By using elementary transformations, find the inverse of  $A = \begin{bmatrix} 1 & 2 \\ 2 & -1 \end{bmatrix}$ 

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**4.** Find 
$$\frac{dy}{dx}$$
, if  $x = a \left( \cos t + \log \tan \frac{t}{2} \right), y = a \sin t$ .

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5. Verify Mean Value Theorem for the function  $f(x) = x^2$  in the interval [2,4].



**6.** Find two positive number whose sum is 15 and the sum of whose squares is minium.



7. Evaluate: 
$$\int \!\! rac{x}{(x+1)(x+2)} dx$$

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

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9. Find the area bounded by the curve y=cos x between x=0- and

 $x = 2\pi$ 

**10.** Find the equation of a curve passing through the point (-2,3), given

that slope of the tangent to the curve at any point (x,y) is  $\frac{2x}{y^2}$ 

11. Show that the position vector of the point P, which divides the line joining the points A and B having position vectors  $\overrightarrow{a}$  and  $\overrightarrow{b}$  internally in the ratio m:n is  $\frac{m\overrightarrow{b}+n\overrightarrow{a}}{m+n}$ 

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**12.** Find x such that the four point A(3,2,1),B(4,x,5),C(4,2,-2) and D(6,5,-1) are coplanar.

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**13.** Find the vector and cartesian equation of the plane which passe3s throught the points (5,2,-4) and perpendicular to the line with direction ratios 2,3,-1.

**14.** A man is known to speak trugth 3 out of 4 times. He throws a die and reports that it is a six. Find the probability that it is actually a xsix.

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Part D
<b>1.</b> Prove that the funciton $f: R \to R$ defined by f(x)=4x+3 is invertible and find the inverse of f. Watch Video Solution
<b>2.</b> If $A = \begin{bmatrix} 0 & 6 & 7 \\ -6 & 0 & 8 \\ 7 & -8 & 0 \end{bmatrix}$ , $B = \begin{bmatrix} 0 & 1 & 1 \\ 1 & 0 & 2 \\ 1 & 2 & 0 \end{bmatrix}$ and $C = \begin{bmatrix} 2 \\ -2 \\ 3 \end{bmatrix}$ Calculate AC, BC and (A+B)C. Also verify that (A+B)C=AC+BC.

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

$$x + y + z = 6$$

- y + 3z = 11
- x 2y + z = 0



**4.** If y=3 cos(log x)+4 sin(log x), show that  $x^2y_2 + xy_1 + y = 0$ 



5. Sand is pouring from a pipe at the rate of  $12cm^3/s$ . The falling sand forms a cone on the top of ground in such a way that the height of the cone is always one-sixth of the radius of the base. How fast is the height of the sand cone increasing when the height is 4cm?

**6.** Find the integral of  $\sqrt{a^2+x^2}$  with respect to x and hence evaluate

$$\int \sqrt{1+x^2} dx$$

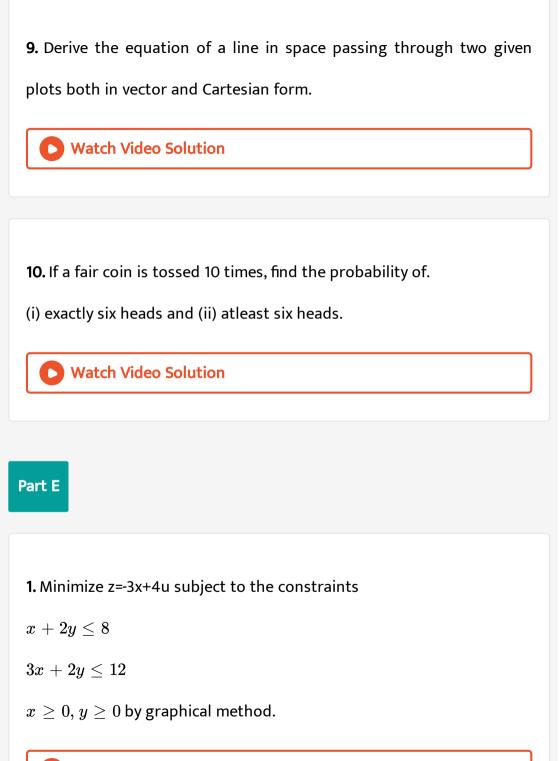
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7. Using the method of integration, find the smaller area enclosed by

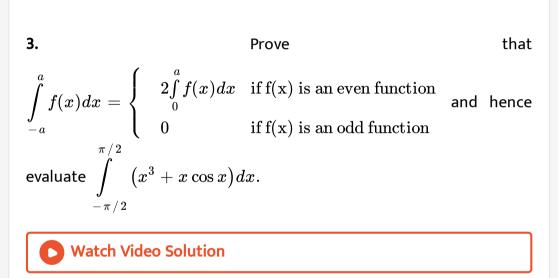
the circle  $x^2 + y^2 = 4$  and the line x+y=2.

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



**2.** Prove that 
$$\begin{vmatrix} 1 & a & a^2 \\ 1 & b & b^2 \\ 1 & c & c^2 \end{vmatrix} = (a-b)(b-c)(c-a)$$



4. for what value of k is the funcation .

$$f(x)=egin{cases} kig(x^2-2xig), & ext{if} & x\leq 0\ 4x+1, & ext{if} & x>0 \end{cases}$$

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(i) continuous at x=0? (ii) continuous at x= 1?
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(iii) continuous at x = -1?