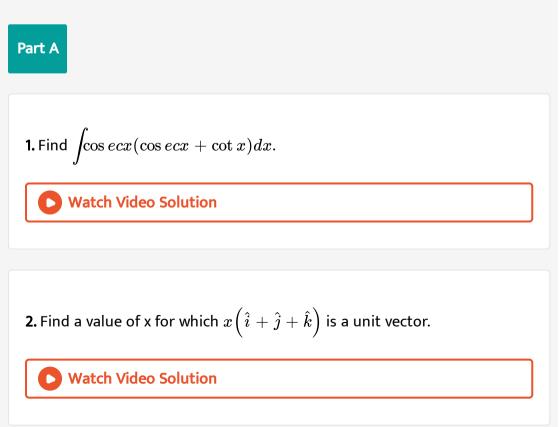




MATHS

BOOKS - JEEVITH PUBLICATIONS MATHS (KANNADA ENGLISH)

ANNUAL EXAM QUESTION PAPER MARCH 2016



3. If
$$y = (\log)^{\cos x}$$
 find $\frac{dy}{dx}$.



4.
$$\cos\left(\sec^{-1}x + \cos ec^{-1}x
ight), |x| \geq 1$$

5. If vector $\overline{AB}=2\hat{i}-\hat{j}+\hat{k}~~{
m and}~~\overline{OB}=3\hat{i}-4\hat{j}+4\hat{k}$, find the position vector \overline{OA}

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6. Find the distance of the point (-6, 0, 0) from the plane 2x - 3y + 6z = 2.



7. If
$$egin{bmatrix} x+2 & y-3 \ 0 & 4 \end{bmatrix}$$
 is a scalar matrix. Find x and y.

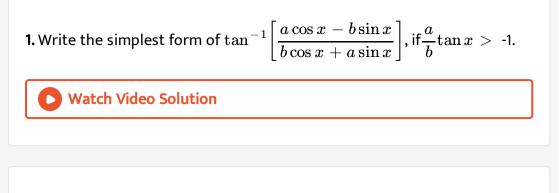
8. If P(A) = 0.8 and P(B/A) = 0.4 then find $P(A \cap B)$



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

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10. Define feasible region in a linear programming Problem.



- 2. Using determinants show that points A(a, b + c), B(b, c + a) and C(c, a +
- b) are collinear.



3. If functions
$$f: R - > R$$
 and $g: R - > R$ arc given by $f(x) = |x|$ and $g(x) = |x|$, (where $|A|$ is indicatescates: integer function) find $fog\left(\left|-\frac{1}{2}\right|\right)$ and go $f\left(-\frac{1}{2}\right)$.

4. Prove the following:

$$\sin^{-1}\Bigl(2x\sqrt{1-x^2}\Bigr) = 2\cos^{-1}x, \; -rac{1}{\sqrt{2}} \leq x \leq rac{1}{\sqrt{2}}$$

5. Find
$$rac{dy}{dx}, \hspace{1em} ext{if} \hspace{1em} y=x^{\sin x}, \hspace{1em} x>0.$$

6. If
$$x^y = a^x$$
 ,prove that $rac{dy}{dx} = x \log_e a - rac{y}{x} \log_e x.$

7. find
$$\int \frac{1}{\sin x \cos^3 x} \mathrm{d}x.$$

8. Using differentials, find the approximate value of each of the following upto 3 place of decimal.

(i) $\sqrt{25.3}$

9. Prove the following:

$$\sin^{-1}\Bigl(2x\sqrt{1-x^2}\Bigr) = 2\cos^{-1}x, \; -rac{1}{\sqrt{2}} \leq x \leq rac{1}{\sqrt{2}}$$

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10. If
$$\left| \overrightarrow{a} + \overrightarrow{b} \right| = \left| \overrightarrow{a} - \overrightarrow{b} \right|$$
 prove that a and b are perpendicular.

11. Find angle between the vectors

$$\vec{a} = \vec{i} + \hat{j} - \hat{k}$$
 and $\vec{b} = \hat{i} + \hat{j} + \hat{k}$.

12. The random variable X has a probability distribution P(X) of the

following form, where K is some number $P(X) = \begin{cases} K & \text{if } x = 0 \\ 2K & \text{if } x = 1 \\ 3K & \text{if } x = 2 \\ 0 & \text{otherwise} \end{cases}$

(a) Determine the value of K.

(b) Find P(X < 2).

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13. The random variable X has a probability distribution P(X) of the

following form, where K is some number
$$P(X) = \begin{cases} K & \text{if } x = 0 \\ 2K & \text{if } x = 1 \\ 3K & \text{if } x = 2 \\ 0 & \text{otherwise} \end{cases}$$

(a) Determine the value of K.

(b) Find P(X < 2).

1. Using elementary transformations, find the inverse of the matrices

 $\begin{bmatrix} 1 & -1 \\ 2 & 3 \end{bmatrix}$

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2. Show that the relation R in the set $A = \{x \in z, 0 \leq x \leq 12\}$ given by

 $R = \{(a, b) : |a - b| \text{ is a multiple of 4}\}$ is an equivalence relation.

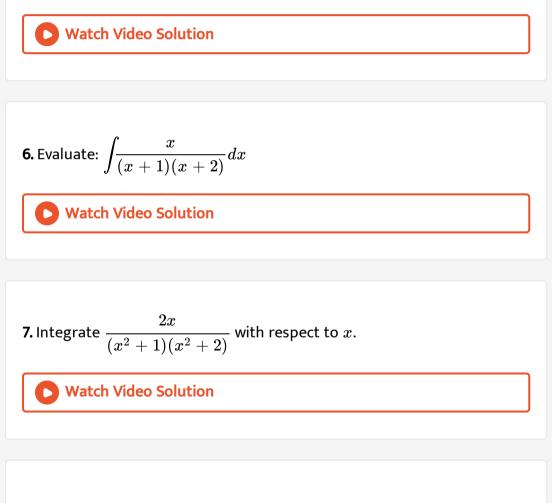
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3. Verify Mean Value Theorem if $(x) = x^3$ - $5x^2$ - 3xin the interval [1, 3].

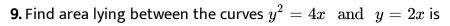
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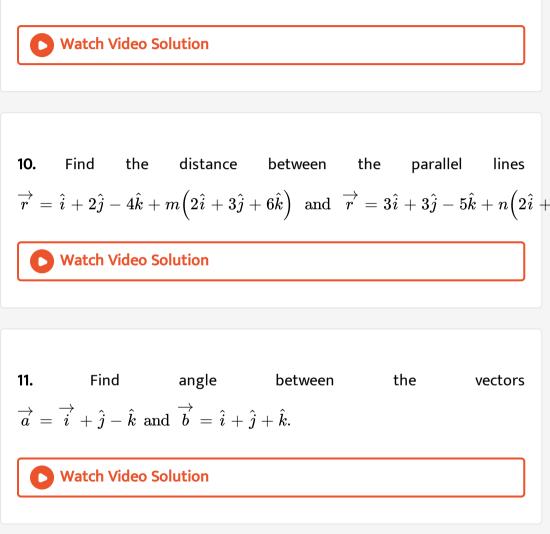
4. If
$$x=a\cos^3 0$$
 and $y=a\sin^3=0$, prove that $\displaystyle rac{dy}{dx}=\ -\sqrt[3]{rac{y}{x}}.$

5. Box I contains 2 gold coins, while another Box-II contains I gold and 1 silver coin. A person chooses a box at random and takes out a coin. If the coin is gold, what is the probability that the other coin in the box is also of gold?



8. Find two numbers whose product is 100 and whose sum is minimum.





12. Find the equation of the curve passing through the point (1, 1), given

that the slope of the tangent to the curve at any point is $\frac{x}{y}$

Part D

1. If
$$A = \begin{bmatrix} 1 \\ 4 \\ 5 \end{bmatrix}$$
 and $B = \begin{bmatrix} 1 & 3 & 6 \end{bmatrix}$ verify that $(AB)^{`} = B^{`}A^{`}$.

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2. 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.

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3. The length x of a rectangle is decreasing at the rate of 3 cm/min and the width y is increasing at the rate of 2cm/min. When x=10cm and y=6cm, find the ration of change (i) the perimeter and (ii) the area of the reactangle.



4. If
$$y=ig(\sin^{-1}xig).$$
 Show that $ig(1-x^2ig)rac{d^2y}{dx^2}-xig(rac{dy}{dx}ig)=0$

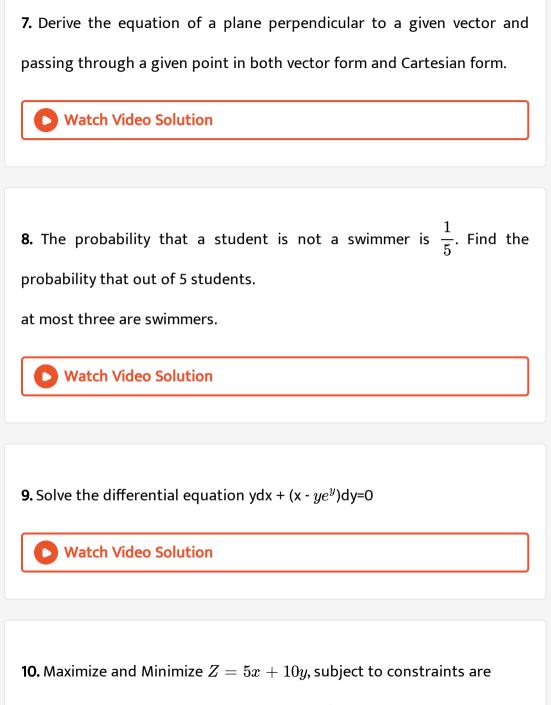
5. Find the integral of
$$\frac{1}{x^2 + a^2}$$
 w.r.t.x and hence evaluate $\int \frac{1}{x^2 + 2x + 3}$ dx.

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6. Using integration find the area of region bounded by the triangle

whose vertices are (1, 0), (2, 2) and (3, 1).





 $x+2y \leq 120, x+y \geq 60, x-2y \geq 0 \ \ ext{and} \ \ x,y \geq 0.$

