





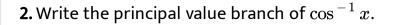
MATHS

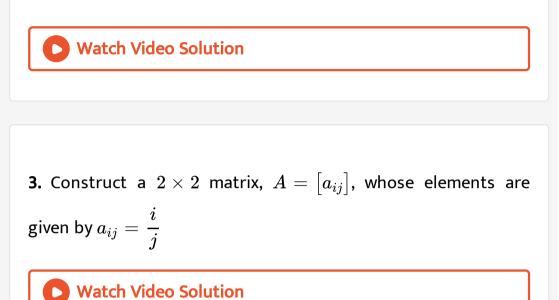
BOOKS - JEEVITH PUBLICATIONS MATHS (KANNADA ENGLISH)

ANNUAL EXAMINATION QUESTION PAPER MAR-2018



1. Define a bijective function.



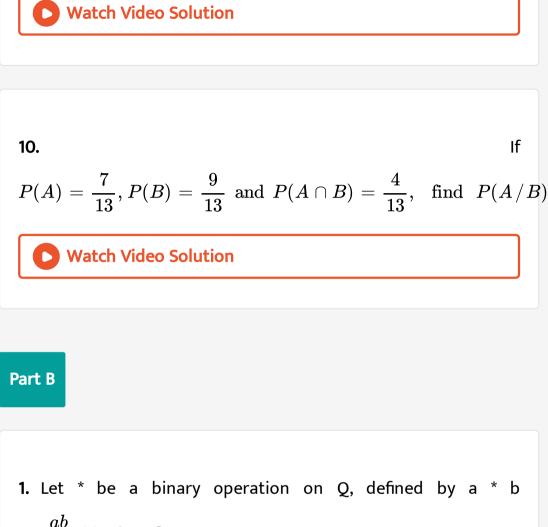


4. If A is invertible matrix of order 2 then find $|A^{-1}|$.



5. If
$$y = e^{3x}$$
, find $\frac{dy}{dx}$

9. Define optimal solution in linear programming problem.



 $=rac{ab}{2},\,orall a,b\in Q$. Determine whether * is commutative or

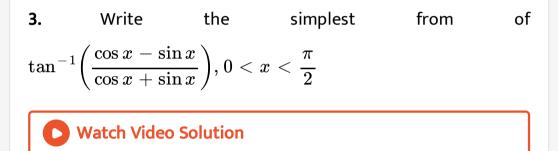
associative.



2. Simplify the following:

$$\mathsf{lf} \sin \biggl\{ \sin^{-1} \frac{1}{5} + \cos^{-1} x \biggr\} = 1 \, \mathsf{find} \, \mathsf{x}$$

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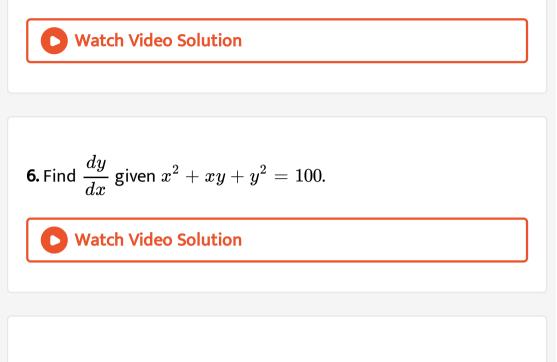


4. Find the area of the triangle whose vertices are (-2,-3), (3,2)

and (-1,-8) by using determinant method.



5. Differentiate : $x^{\sin x}$ with respect to x.



7. Find the slope of the tangent to the curve $y=x^3-x$ at

x = 2.



8. Integrate
$$rac{e^{ an^{-1}}x}{1+x^2}$$
 with respect to x.

9. Evaluate
$$: \int_{2}^{3} \frac{x dx}{x^2 + 1}$$
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10. Find the order and degree of the differential equation:

$$\left(rac{d^3y}{dx^3}
ight)^2+\left(rac{d^2y}{dx^2}
ight)^3+\left(rac{dy}{dx}
ight)^4+y^5=0$$

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11. Find the projection of the vector $\hat{i}+3\hat{j}-7\hat{k}$ on the vector $7\hat{i}+\hat{j}+8\hat{k}$

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 planes whose vector equation are

$$r.\left(2\hat{i}+2\hat{j}-3\hat{k}
ight)=5, r.\left(3\hat{i}-3\hat{j}+5\hat{k}
ight)=3.$$

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1. Show that the relation R in the set A={1,2,3,4,5} given by R=

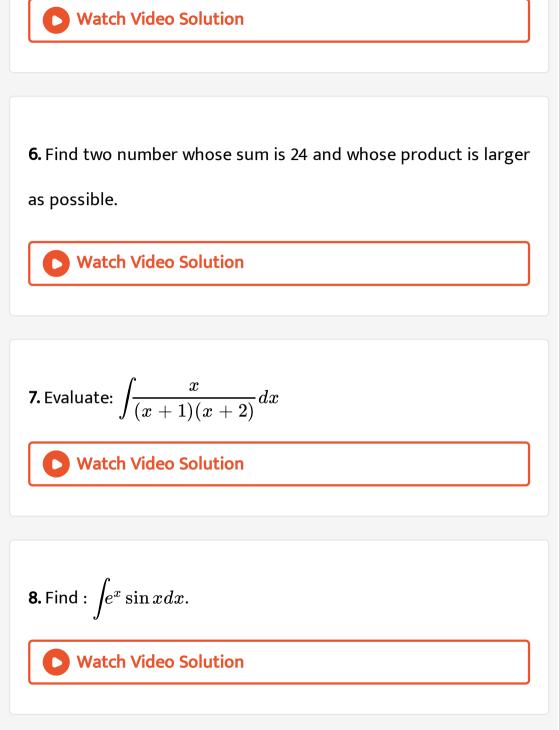
{(a,b) : |a-b| is even}, is an equivalence relation.



2. Prove that
$$2\tan^{-1}\frac{1}{2} + \tan^{-1}\frac{1}{7} = \tan^{-1}\frac{31}{17}$$

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3. By using elementary transformations, find the inverse of the matrix $A = \begin{bmatrix} 1 & 3 \\ 2 & 7 \end{bmatrix}$
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4. x=sin t, y= cos 2t. Find dy/dx
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5. Verify Rolle's theorem for the function $f(x)=x^2+2, x\in [-2,2]$



9. Find the area of the region bounded by the curve $y=x^2$ and

the line y = 4.



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. 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 $\frac{m\overrightarrow{b}+n\overrightarrow{a}}{m+n}$

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.

13. Find the equation of the plane through the intersection of the planes 3x - y + 2z - 4 = 0 and z + y + z - 2 = 0 and the point (2,2,1)'.



14. A beg contains 4 red and 4 black , another bag contains 2 red and 6 black balls. One of the two bags is selected at random and a ball is drawn from the bag which is found to be red. Find the probability that the ball is drawn from the first bag.

Part D

1. Let R_+ be the set of all non-negative real numbers. Show that the function $f:R_+ o [4,\infty]$ defind by $f(x)=x^2+4$ Is invertible and write the inverse of f.

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2.

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

If

Calculate AC, BC and (A+B)C. Also verify that (A+B)C=AC+BC.

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

x-y+2z=7

3x+4y-5z=-5

2x-y+3z=12

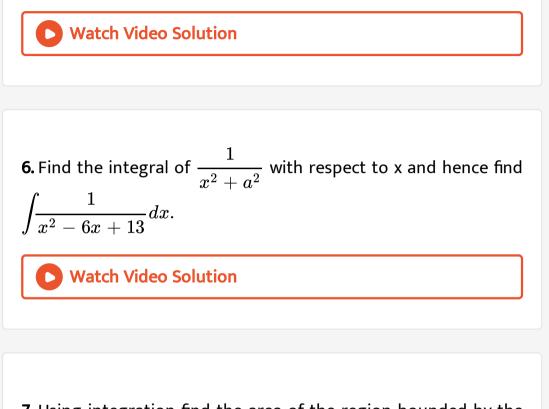
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4. If
$$y = (\tan^{-1} x)^2$$
 then show that
 $(x^2+1)^2 \frac{d^2 y}{dx^2} + 2x(x^2+1)\frac{dy}{dx} = 2$
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5. Sand is pouring from a pipe at the rate of $12cm^3/s$. The falling sand forms a cone on the ground in such a way that the

height of the cone is always one-sixth of the base. How fast

height of the sand cone increasing when the height is 4 cm?



7. Using integration find the area of the region bounded by the

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



8. Find the general solution of the differential equation $x \frac{dy}{dx} + 2y = x^2 \log x.$



9. Derive the equation of a line in space passing through two given plots both in vector and Cartesian form.



10. If a fair coin is tossed 10 times, find the probability of.

(i) exactly six heads and (ii) atleast six heads.

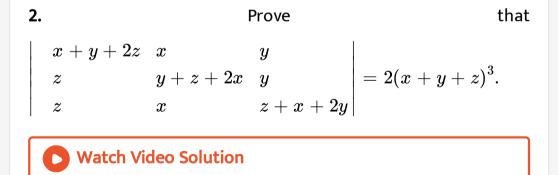


1. Prove that
$$\int_0^a f(x) dx = \int_0^a f(a-x) dx$$
 and hence evaluate

the following:

(a)
$$\int_0^a rac{\sqrt{x}}{\sqrt{x}+\sqrt{a}-x} dx$$

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3. Solve the following problem graphically

Minimise and Maximise

z=3x+9y

Subject to the constraints:

 $x+3y\leq 60, x+y\geq 10, x\leq yx\geq 0, y\geq 0$



4. Find the relationship between a and b so that the function

defined by

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