

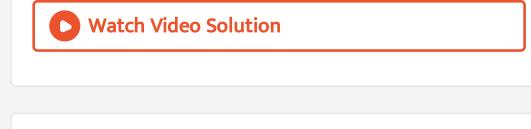
MATHS

BOOKS - SUNSTAR MATHS (KANNADA ENGLISH)

II PUC MATHEMATICS (ANNUAL EXAM QUESTION PAPER MARCH - 2015)



1. Let * be a operation defined on the set of non zero rational numbers by $a \cdot b = \frac{ab}{4}$ Find the identity element.



2. Write the value of x for which

$$2 an^{-1}x=\cos^{-1}igg[rac{1-x^2}{1+x^2}igg]$$
 holds:

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3. Construct 2×2 matrix A=[aij] whose elements are

given by:

$$a_{ij}=rac{1}{2}ert-3i+jert$$

4. 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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5.
$$y=\sinig(x^2+5ig)$$
 , Find $rac{dy}{dx}$

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6. Evaluate:

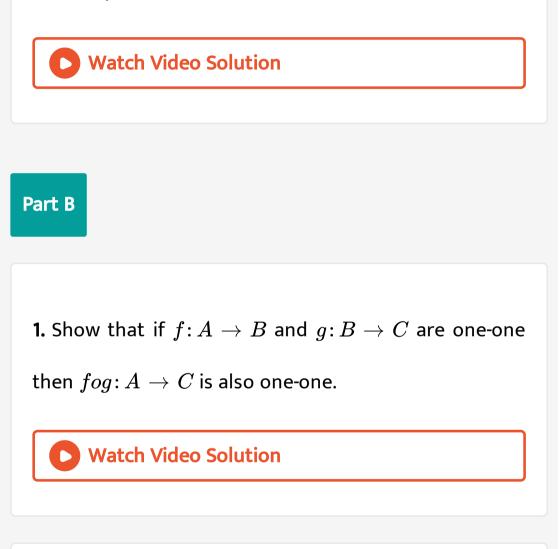
$$\int e^{x} \left(rac{x-1}{x^2}
ight) dx$$

7. Define negative of a vector.

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8. Write the direction cosines of x-axis.
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9. Define Feasible region in LPP.
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10. If
$$P(A) = rac{3}{5}P(B) = rac{1}{5}$$
. Find $P(A \cap B)$ if A an B

are independent events.



2. Show that
$$\sin^{-1} \Bigl(2x \sqrt{1-x^2} \Bigr) = 2 \sin^{-1} x$$
 ,

3. Show that
$$2\tan^{-1}\left(\frac{1}{2}\right) + \tan^{-1}\left(\frac{1}{7}\right) = \tan^{-1}\left(\frac{31}{17}\right)$$

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4. If the area of the triangle with vertices (-2, 0) (0, 4) and (0,k) is 4 square units. Find the value of k using determinants.



5. Differentiate
$$\left(x+rac{1}{x}
ight)^x$$
 w.r.t.x

6. Find the slope of the tangent to the curve.

$$y=rac{x-1}{x-2}x
eq 2$$
 at $x=10$

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7. Find
$$\displaystyle rac{dy}{dx}$$
, If $x^2+xy+y^2=100$

8. Evaluate:
$$\int \frac{\cos 2x - \cos 2\alpha}{\cos x - \cos \alpha} dx$$

9. Evaluate:
$$\int \frac{dx}{x-\sqrt{x}}$$

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10. Find the order and degree (it defined) of the differential equation $\left(\frac{d^2y}{dx^2}\right)^3 + \left(\frac{dy}{dx}\right)^2 + \sin\left(\frac{dy}{dx}\right)^2 + 1 = 0$.

11. Find
$$\left| \overrightarrow{b} \right|$$
 if $\left(\overrightarrow{a} + \overrightarrow{b} \right) \cdot \left(\overrightarrow{a} - \overrightarrow{b} \right) = 8$ and $\left| \overrightarrow{a} \right| = 8 \left| \overrightarrow{b} \right|$
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12. Find the area of the parallelogram whose adjacent

sides are determined by the vectors.

$$\stackrel{
ightarrow}{a}=\hat{i}+\hat{j}+3\hat{k}$$
 and $\stackrel{
ightarrow}{b}=2\hat{i}+7\hat{j}+\hat{k}$

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13. Find the angle between pair of lines given by:

$$\overrightarrow{r}=3\hat{i}+2\hat{j}-4\hat{k}+\lambda\Big(\hat{i}+2\hat{j}+2\hat{k}\Big)$$
and r = 3 ^ i + 2

$$j - 4 + \lambda (i + 2 + j + 2 k)$$

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14. Let X denote the number of hours you study during randomly selected school day to probability that X can take the values of x, has the following form.

$$P(X=x) = egin{cases} 0.1 & Ifx = 0 \ kx & ext{if} \ x = 1 ext{ or } 2 \ k(5-x) & ext{if} \ x = 3 ext{ or } 4 \ 0 & ext{otherwise} \end{cases}$$
 find the

value of k



1. Determine whether the relation R in the set $A = \{1, 2, 3, \dots, 13, 14\}$ defined as $R = \{(x, y) : 3x - y = 0\}$ is reflexive symmetric and transitive.



2. If
$$\tan^{-1}\left(\frac{x-1}{x-2}\right) + \tan^{-1}\left(\frac{x+1}{x+2}\right) = \frac{\pi}{4}$$
, then

find the value x.

3. If A and B are invertible matrices of same order then prove that $(AB)^{-1} = B^{-1}A^{-1}$

4. Verify Rolles theorem for the function:

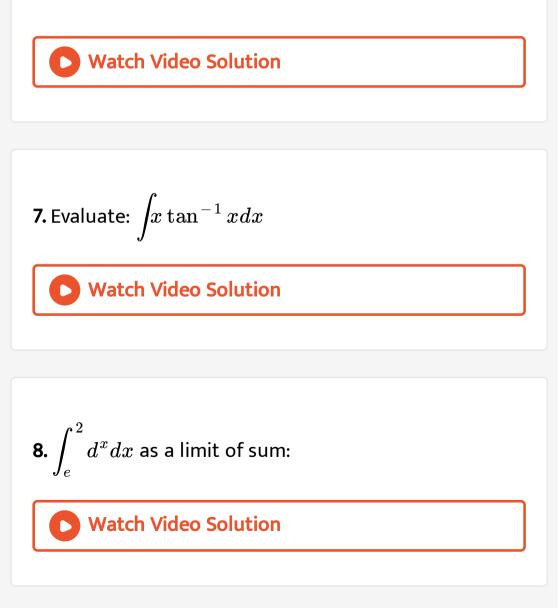
$$f(x) = x^2 + 2x - 8, x \in [\,-4,2]$$

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5.
$$x=\sqrt{a^{\sin^{-1}t}}, y=\sqrt{a^{\cos^{-1}t}}$$
 , Prove that: $rac{dy}{dx}=-rac{y}{x}$

6. Find the two positive numbers whose sum is 15 and

sum of whose squares minimum.



9. Find the area of the region bounded by the curve $y^2 = 4x$ and line x = 3. **Vatch Video Solution**

10. Show that the position vector of the point P, which divides the line joining the points A and B having position vector a and b internally in the ratio:

m:n is
$$\dfrac{m\overrightarrow{b}+n\overrightarrow{a}}{m+n}$$

11. Show that the four points which the position:

Vectors:

 $\hat{4i}+\hat{8j}+12\hat{k},2\hat{i}+\hat{4j}+6\hat{k},3\hat{i}+5\hat{j}+4\hat{k},5\hat{i}+\hat{8j}+5\hat{k}$

are coplanar:



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



13. Form the differential equation of circles touching

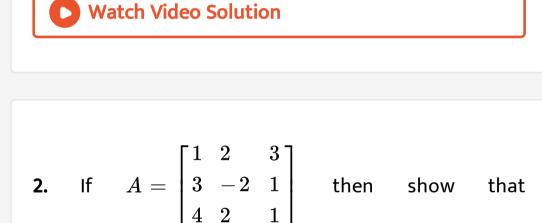
the x-axis at origin:



14. An insurance company insured 2000 scooter drivers 4000 car drivers and 6000 - truck drivers. The probability of an accident are 0.01, 0.03 and 0.15 respectively one of the insured person meets with an accident. What is the probability that he is a scooter driver.



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



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 $A^3 - 23A - 40I = 0$

3. Solve:

2x + 3y + 3z = 5

x - 2y + z = -4

3x - y - 2z = 3 using matrix method

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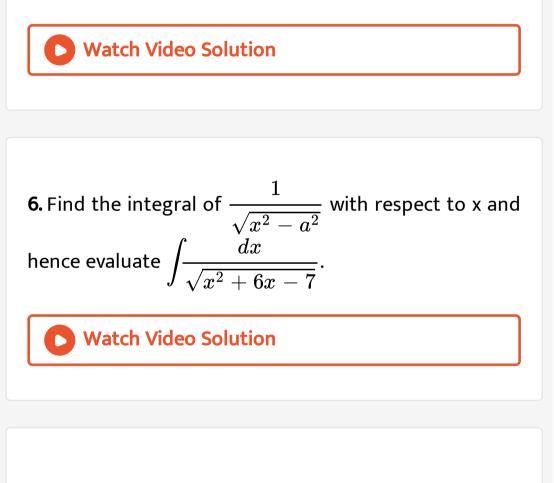
4. If
$$Y = Ae^{mx} + Be^{nx}$$
 show that:

$$rac{d^2y}{dx^2}-(m+n)rac{dy}{dx}+mny=0$$

5. A particle moves along the curve $6y = x^3 + 2$. Find

the points on the curve at which the y coordinate is

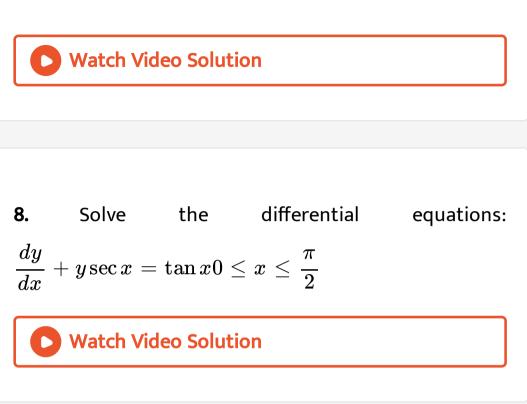
changing 8 times as fast as the x - coordinate.



7. Using integration find the area of the triangular

region whose sides have the equations

$$Y=2x+1, y=3x+1$$
 and $x=4$.



9. Derive the equation of the line in space passing through a point and parallel to a vector both in vector and cartesian form.

10. A die is thrown 6 time if getting an odd numbers is

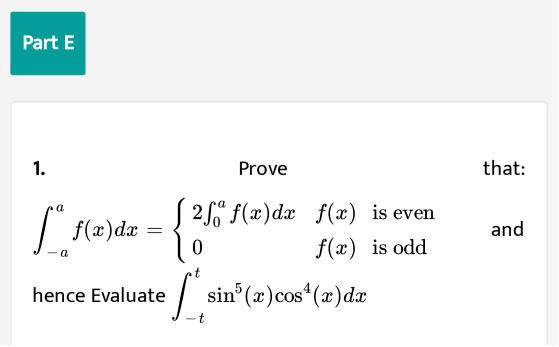
a success. What is the probability of

a. 5 successes

b. at least 5 successes

c. at most 5 successes







2. Prove that:
$$egin{array}{ccc} a^2+1 & ab & ac\ ab & b^2+1 & bc \end{array}$$

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3. Solve graphically: Maximize

z = 8000x + 12000y subjected to

 $9x+12y \leq 180, x+3y \leq 30, x \geq 0\,'y \geq 0$

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4. Find the value of k so that the function:

 $f(x) = egin{bmatrix} kx+1 & ext{if} \ x \leq 5 \ 3x-5 & ext{if} \ x > 5 \end{bmatrix}$ at x=5 is a continous

function: