

MATHS

BOOKS - OSWAAL PUBLICATION MATHS (KANNADA ENGLISH)

II PUC APRIL 2020 CLASS - XII

Part A

1. Let * be the binary opertion on N given by a * b = L. C. M. of a

and b. Find

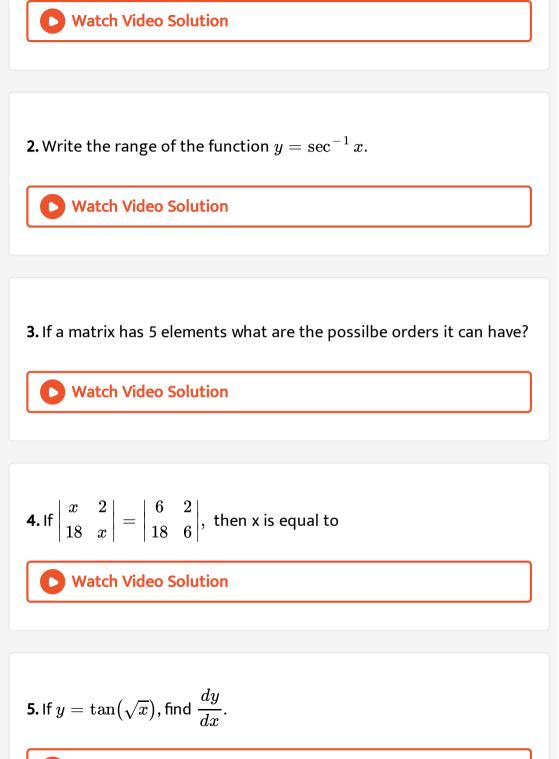
(i) 5 * 7, 20 * 16

(ii) Is * commutative?

(iii) Is * associative?

(iv) Find the identity of * ?

(v) Which elements of N are invertible for the opertion *?



6. Find
$$\int (2x^2 + e^x) dx$$
.



7. Co-initial vectors; coterminous vector and co-planar vectors; negative of a vector; reciprocal vectors

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8. If a line makes angles $90^\circ, 135^\circ\,\,{
m and}\,\,45^\circ\,$ with the X, Y and Z-axis

respectively, find its direction cosines.



9. Define optimal solution in linear programming problem.



10. If
$$P(A) = \frac{3}{5}$$
 and $P(B) = \frac{1}{5}$ find $P(A \cap B)$.

If A and B are independent events

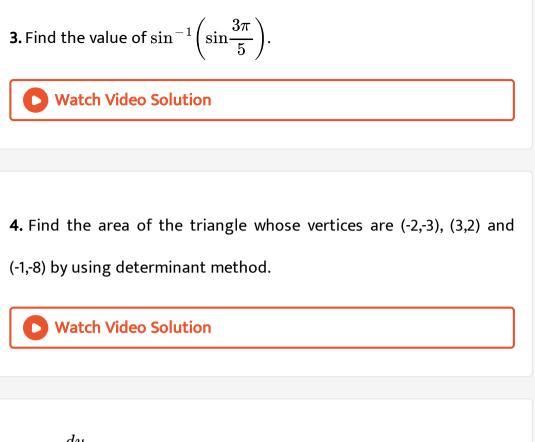
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Part B

1. If f:R o R and g:R o R are given by by f(x)=cos x and $g(x)=3x^2$, then shown that gof
eq fog.

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2. Prove that
$$\cot^{-1}(-x)=\pi-\cot^{-1}x, \ \forall \ \ \mathbf{x} \ \ \in$$
 R.



5. Find
$$rac{dy}{dx}$$
 , if $\sin^2 x + \cos^2$ y= 1

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6. If
$$y=x^x$$
 , find $\displaystyle rac{dy}{dx}$

7. Find the intervals in which the function f given by $f(x) = x^2 - 4x + 6$ is (a) strictly increasing (b) strictly decreasing.

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8.
$$\int \cot \times x \log(\sin x) dx = ?$$

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9. Find
$$\int x \sec^2 x \, dx$$
.

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10. Find the order and degree (if defined) of the differential equation

$$\left(rac{d^2y}{dx^2}
ight)+\left(rac{dy}{dx}
ight)^2+\sin\!\left(rac{dy}{dx}
ight)+1=0$$

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

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12. Find the area of the parallelogram whose adjacent sides are determined by the vectors $\overrightarrow{a} = \hat{i} - \hat{j} + 3\hat{k}$ and $\overrightarrow{b} = 2\hat{i} - 7\hat{j} + \hat{k}$

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13. Find the equation of the plane with the intercept 2,3 and 4 on x,y

and z axes respectively.

14. A random variable X has the following probability distribution.

X = x	2	4	6	8	x > 8
P(X = x)	2 <i>k</i>	4 <i>k</i>	6k	6k	0

Find the value of K.



Part C

1. Show that the relation R defined in the set A of all triangles as

 $R = \{(T_1, T_2): T_1 \text{ is similar to } T_2\}$, is equivalence relation.



2. Prove that
$$2 an^{-1} \left(rac{1}{2}
ight) + an^{-1} \left(rac{1}{7}
ight) = \sin^{-1} \left(rac{31}{25 \sqrt{2}}
ight)$$

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3. If
$$F(x) = \begin{bmatrix} \cos x & -\sin x & 0\\ \sin x & \cos x & 0\\ 0 & 0 & 1 \end{bmatrix}$$
 show that F(x)F(y)=F(x+y)`

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4. If
$$x = 2at^2, y = at^4$$
 then find $\frac{dy}{dx}$.

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5. Verify mean value theorem for the function $f(x)=x^2+4x-3$ in

the interval [-2,2]

6. Use differential to approximate $\sqrt{36.6}$



7. Evaluate
$$\int rac{(x-3)e^x}{\left(x-1
ight)^3}\,dx$$

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8. Evaluate :
$$(i) \int_0^{\pi/2} \cos^3 x dx \; (ii) \int_0^{\pi/2} \sin^4 x dx$$

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9. Find the area of the region bounded by $x^2 = 4y, y = 2, y = 4$ and

the y-axis in the first quadrant.

10. Find the equation of a curve passing through the point (2, 3), given that the slope of the tangent to the curve at any point (x, y) is $\frac{2x}{y^2}$.

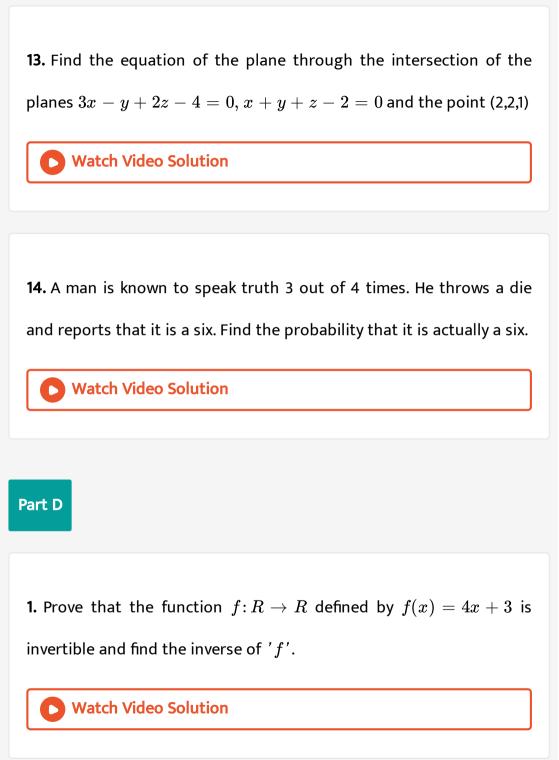
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11. Find a unit vector perpendicular to each of the vector

 $egin{pmatrix} \overrightarrow{a} + \overrightarrow{b} \ and \ \overrightarrow{a} - \overrightarrow{b} \ \end{pmatrix}$, where $\overrightarrow{a} = \hat{i} + \hat{j} + \hat{k}, \ \overrightarrow{b} = \hat{i} + 2\hat{j} + 3\hat{k}$

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



2.

if
$$A = \begin{bmatrix} 1 & 2 & -3 \\ 5 & 0 & 2 \\ 1 & -1 & 1 \end{bmatrix}, B = \begin{bmatrix} 3 & -1 & 2 \\ 4 & 2 & 5 \\ 2 & 0 & 3 \end{bmatrix}$$
 and $c = \begin{bmatrix} 4 & 1 & 2 \\ 0 & 3 & 2 \\ 1 & -2 & 3 \end{bmatrix}$

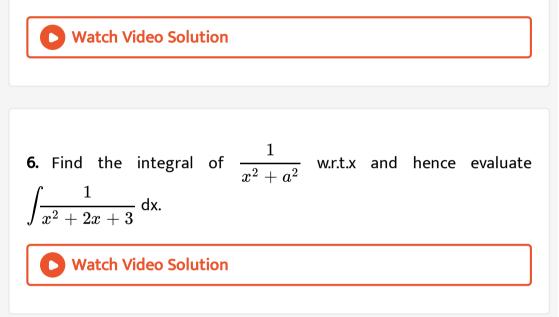
then compure (A+B) and (B-C), Also , verify that A+(B-C)=(A+B)-C.`

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3. Solve system of linear equations, using matrix method, 2x + 3y + 3z = 5x - 2y + z = -43x - y2z = 3Watch Video Solution

4. If
$$y=\left(an^{-1}x
ight)^2$$
, show that $\left(x^2+1
ight)^2y_2+2xig(x^2+1ig)y_1=2$

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 1/6th of the radius of the base. How fast does the height of the sand cone increase when the height in 4 cm?



7. Find the area of the smaller region bounded by the ellipse $\frac{x^2}{9} + \frac{y^2}{4} = 1$ and the line $\frac{x}{3} + \frac{y}{2} = 1$.

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

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9. Derive the equation of a line in space passing through a given pont and parallel to a given vector in both vector and Cartesian form.

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10. A person buys a lottery ticket in 50 lotteries, in each of which his chance of winning a prize is $\frac{1}{100}$. What is the probability that he will win a prize(a) at least once (b) exactly once (c) at least twice?

1. Prove that
$$\int_{-a}^{a} dx = \begin{cases} 2\int_{0}^{a} f(x)dx & \text{ if } f(x) \text{ is even} \\ 0 & \text{ if } f(x) \text{ is odd} \end{cases}$$
 and hence

evaluate

(a)
$$\int_{-1}^1 \sin^5 x \cos^4 x dx.$$

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2. (a) Maximise z = 4x + y

subject to constraints :

 $x + y \leq 50$

 $3x + y \leq 90$

$$x \ge 0$$

$$y \geq 0$$

by graphical method.

(b) Find the value of K, if f(x) = $\begin{cases} Kx+1 & ext{if} x \leq \pi \\ \cos x & ext{if} \ x > \pi \end{cases}$ is continuous at

 $x = \pi$.

