



MATHS

BOOKS - CBSE COMPLEMENTARY MATERIAL MATHS (HINGLISH)

PRACTICE PAPER I

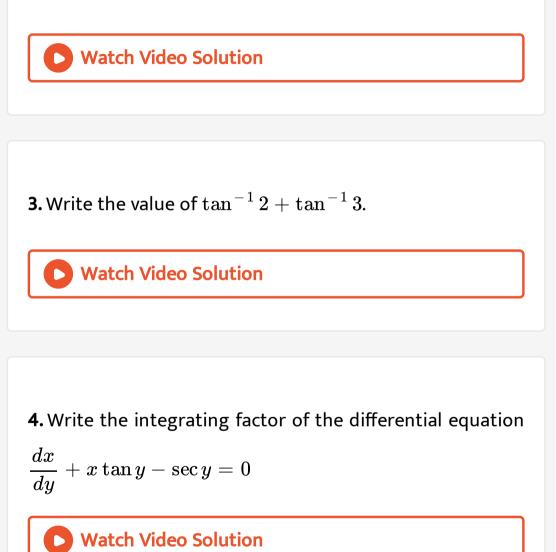
Section A

1. Find the sum of order and degree of the differential

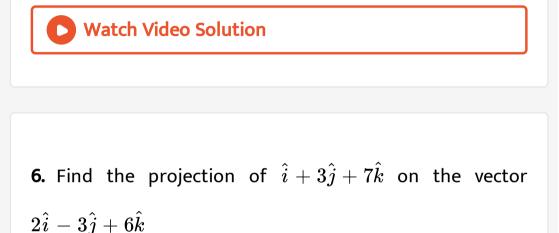
equation
$$rac{d^2y}{dx^2} = \left[1 + \left(rac{dy}{dx}
ight)^2
ight]^3$$

2. Write the smallest reflexive relation on set A = {1, 2, 3, 4,

5}.



5. Find ' λ ' . If the vectors $\lambda\hat{i}+\hat{j}+2\hat{k},2\hat{i}-\hat{j}+\lambda\hat{k}$, and $\hat{i}+\lambda\hat{j}-\hat{k}$ are coplanar.



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7. The probability distribution of discrete random variable

X is given below

find the value of K.

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8. If A and B are two events such that
$$P(A) = \frac{1}{4}$$
,
 $P(B) = \frac{1}{2}$ and $P(A \cap B) = \frac{1}{8}$, find P (not A and not B).
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9. For what value of x, is the following matrix singular ?
 $\begin{bmatrix} 3 - 2x & x + 1 \\ 2 & 4 \end{bmatrix}$
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10. If
$$\begin{bmatrix} 2x & 3 \end{bmatrix} \begin{bmatrix} 1 & 2 \\ -3 & 0 \end{bmatrix} \begin{bmatrix} x \\ 8 \end{bmatrix} = 0$$
, find 'x'

11. Find maximum value of z=2x+3y subject to the

constraints $x+y\leq 4, x\geq 0, y\geq 0$.

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12. For what value of 'k' the function

 $egin{cases} kx^2, & x\leq 2\ 3, & x>2 \end{cases}$ is continuous at x=2

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13. Differentiate sin $\sqrt{x}+\cosig(x^2ig)$ w.r.t. x

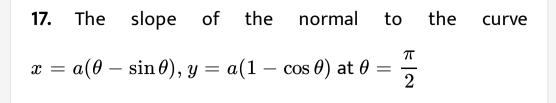
14. Evaluate
$$\int \sqrt{rac{x}{1-x^3}} dx$$

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15. Evaluate
$$\int_{-1}^{1} ig(x^7+ an^5x+x+1ig)dx$$

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16. Evaluate
$$\int (4\cot x - 5\tan x)^2 dx$$





18. Show that the function given by f(x) = 7x3 is strictly

increasing on R.

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19. If the radius of a sphere is measured as 9cm with an error of 0.03 cm, then find the approximate error in calculating its volume.

20. The radius of a balloon is increasing at the rate of 10 cm/sec. At what rate is the surface area of the balloon increasing when the radius is 15 cm?

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Section B

1. Prove that $\cos \tan^{-1} \sin \cot^{-1} x = \sqrt{rac{x^2+1}{x^2+2}}$

2. Solve the equation
$$\sin^{-1} yx + \sin^{-1} 6\sqrt{3}x = \frac{-\pi}{2}$$
.
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3. Using properties of determinants, prove the following:
 $|11 + p1 + p + q23 + 2p1 + 3p + 2q36 + 3p1 + 6p + 3q| = 1$
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4. If
$$2x = y^{\frac{1}{m}} + y^{-\frac{1}{m}}$$
, show that $d^2 y = dy$

$$ig(x^2-1ig)rac{d^2y}{dx^2}+xrac{dy}{dx}=m^2y.$$

5. If
$$y = x \log \left\{ \frac{x}{(a+bx)} \right\}$$
, then show that
 $x^3 \frac{d^2y}{dx^2} = \left(x \frac{dy}{dx} - y \right)^2$.
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6. Evaluate: $\int \frac{x^2 + 1}{(x^2 + 4)(x^2 + 25)} dx$

7. If the magnitude of the vector product of the vector $\hat{i} + \hat{j} + \hat{k}$ with a unit vector along the sum of vector $2\hat{i} + 4\hat{j} - 5\hat{k}$ and $\lambda\hat{i} + 2\hat{j} + 3\hat{k}$ is equal to $\sqrt{2}$, then find the value of ' λ '

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8. If $\overrightarrow{a} = 3\hat{i} + 4\hat{j} + 5\hat{k}$ and $\overrightarrow{\beta} = 2\hat{i} + \hat{j} - 4\hat{k}$, then express $\overrightarrow{\beta} = \overrightarrow{\beta}_1 + \overrightarrow{\beta}_2$ such that $\overrightarrow{\beta}_1 \mid | \overrightarrow{\alpha}$ and $\overrightarrow{\beta}_2 \perp \overrightarrow{\alpha}$.

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9. A problem in mathematics is given to three students whose chances of solving it correctly are `1/2,1/3 and 1/4' respectively . what is the probability that only one of , them solves it correctly?



1. Show that the function $f\colon R o R$ defined by $f(x)=rac{x}{x^2+1}\,orall x\in R$ is neither one-one nor onto. Also if $g\colon R o R$ is defined by g(x)=2x-1 find fog(x)

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2. Let Z be the set of all integers and R be the relation on Z defined as $R = \{(a, b); a, b \in Z, \text{ and } (a - b) \text{ is divisible by 5}\}$. Prove that R is an equivalence relation.

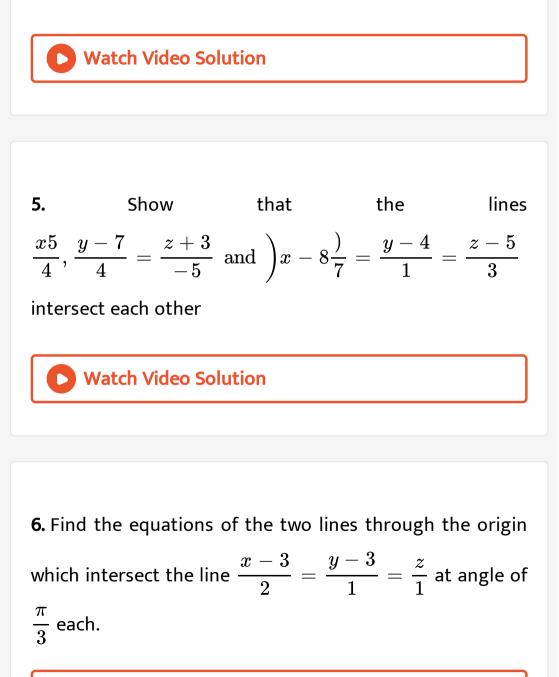
3. The tailors A and B are per Rs.225 and Rs.300 per day respectively. A can stitch 9 shirts and 6 pants while B can stitch 15 shirts and 6 pants per day. Form a linear programming problem to minimize the labour cost to produce atleast 90 shirts and 45 pants. Solve the problem graphically.

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4. There are three coins one is a two-headed coin having head on both faces , another is a biased , coin that coines up tails 25% of the times and third is an unbiased coin. One of the three coins is chosen at random and tossed, it

shows head what is the probability that it was a two-

headed coin ?



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7. Prove that
$$\int_0^a f(x)dx = \int_0^a f(a-x)dx$$
, hence evaluate $\int_0^\pi \frac{x\sin x}{1+\cos^2 x}dx$

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8. Evaluate
$$\int_{1}^{4} \left(x^2 - x\right) \, dx$$
 as a limit of sums.

9. Show that the differential equation
$$x \frac{dy}{dx} \sin\left(\frac{y}{x}\right) + x - y \sin\left(\frac{y}{x}\right) = 0$$
 is homogenous. Find

the particular solution of this differential equation, given

that
$$x=1$$
 when $y=rac{\pi}{2}.$

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Section D

1. If
$$A = egin{bmatrix} 2 & 5 & 3 \ 3 & 4 & -2 \ 4 & -6 & -2 \end{bmatrix}$$
, find A^{-1} .

Hence solve the system of equations

$$rac{2}{x}+rac{3}{y}+rac{4}{z}=\ -3, rac{5}{x}+rac{4}{y}-rac{6}{z}=4, rac{3}{x}-rac{2}{y}-rac{2}{z}=6$$

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2. If the sum of the lengths of the hypotenues and a side of a right angled triangle is given, show that the area of the triangle is maximum when the angle between them is $\pi/3$.

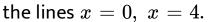


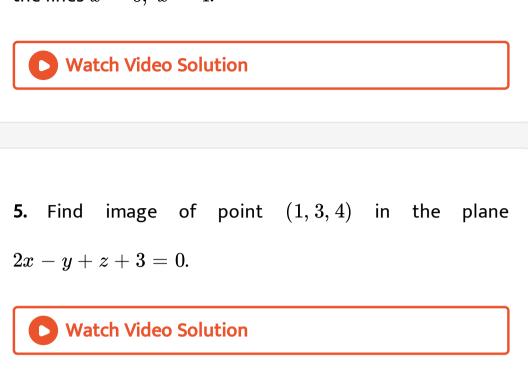
3. Find the volume of the larges cylinder that can be inscribed in a sphere of radius r



4. Sketch the graph of $y=x+1~\in~[0,~4]$ and determine

the area of the region enclosed by the curve, the x-axis and





6. Find the foot of perpendicular drawn from the point P (1,2,3) on the line $\frac{x-6}{3} = \frac{y-7}{2} = \frac{7-z}{2}$. Also find the equation of the plane containing the line and the point (1,2,3).