



MATHS

BOOKS - ARIHANT PRAKASHAN

VERY SIMILAR TEST 6

Section A Answer All The Questions

1. Prove that
$$f(x)=rac{3}{x}+7$$
 is strictly decreasing for $x\in R, (x
eq 0).$

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2. Evaluate
$$\int (ax+b)^3 dx$$

3. Find the integrating factor of the differential equation

$$igg(rac{e^{-2\sqrt{x}}}{\sqrt{x}}-rac{y}{\sqrt{x}}igg)rac{dx}{dy}=1$$

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4. Find
$$\lambda$$
 and μ if $\left(2\hat{i}+6\hat{j}+27\hat{k}\right) imes\left(\hat{i}+\lambda\hat{j}+\mu\hat{k}\right)=\stackrel{
ightarrow}{0}$.

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5. How many straight lines in space through the origin are equally inclined to the coordinate axes?

6. Let be a binary operation defined by a*b = 7a+9b. Find 3*4.

7. Evaluate
$$\sin\left[\frac{\pi}{3} - \sin^{-1}\left(-\frac{1}{2}\right)\right]$$
.

8. Prove the following :
$$\begin{bmatrix} 1 & bc & a(b+c) \\ 1 & ca & b(c+a) \\ 1 & ab & c(a+b) \end{bmatrix} = 0$$

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9. For the following probability distribution

| Х | 1 | 2 | 3 | 4 | |
|------|----------------|---------------|----------------|---------------|-----------------|
| P(X) | $\frac{1}{10}$ | $\frac{1}{5}$ | $\frac{3}{10}$ | $\frac{2}{5}$ | Find $E(X^2)$. |

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10. Differentiate the function $anig(x^2+5ig)$

1.Provethat
$$\cot^{-1}\left(\frac{\sqrt{1+\sin x}+\sqrt{1-\sin x}}{\sqrt{1+\sin x}-\sqrt{1-\sin x}}\right) = \frac{x}{2}, 0 < x < \frac{\pi}{2}, \text{ or } x \in \left(0, \frac{\pi}{4}\right)$$
..**Watch Video Solution**2. Solve the following LPP graphically.Maximize $z = 4x_1 + 3x_2$ $x_1 + 2x_2 \leq 80, 2x_1 + x_2 \geq 20$ and $x_1, x_2 \geq 0$

3. Show that the relation R on the set Z of integers given by R = {(a,b): 2

divides (a - b)} is an equivalence relation.

4. Show that the function $f\!:\!R o R$ defined by $f(x)=rac{x}{x^2+1}$ is neither one-one nor onto.

5. Solve for x,
$$an^{-1}(x+1) + an^{-1}(x-1) = an^{-1} rac{8}{31} [0 < x < 1].$$

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6. If P(A)=0.8 P(B)=0.5 and $P\!\left(\frac{B}{A}
ight)$ =0.4 then find the value of $P(A\cup B)$

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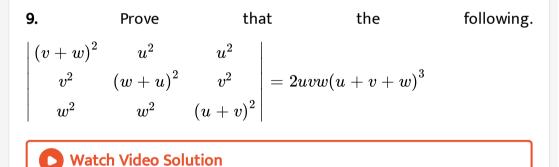
7. Find the inverse of the following matrices using elementary transformation

 $\begin{bmatrix} 3 & -2 & 3 \\ 2 & 1 & -1 \\ 4 & -3 & 2 \end{bmatrix}$



8. If
$$A = \begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$$
 then prove that $A^2 - 5A + 7I = O$

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10. Find the mean and the variance of the number obtained on a throw of an unbiased coin.

11. Find the equation of the tangent and normal to the curve $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ at the point $(\sqrt{2}a, b)$.

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12. Find the local maximum and local minimum values of the function

$$f(x) = \frac{4}{x+2} + x.$$

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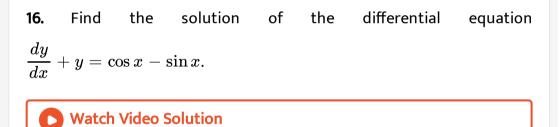
13. If
$$\log \sqrt{x^2+y^2} = an^{-1}igg(rac{x}{y}igg)$$
 , then show that $rac{dy}{dx} = rac{y-x}{y+x}$.

14. If
$$e^{y/x}=rac{x}{a+bx}$$
 then show that $x^3rac{d}{dx}igg(rac{dy}{dx}igg)=igg(xrac{dy}{dx}-yigg)^2$

15. Verify, MVT, if $f(x) = x^2 - 4x - 3$ in the interval [a,b], where a =1

and b=4.





17. Solve
$$rac{dy}{dx}+2y an x=\sin x, ext{if}y\Big(rac{\pi}{3}\Big)=0.$$

18. Evaluate
$$\int \frac{dx}{e^{4x}-5}$$

19. Evaluate
$$\int_1^2 \left(4x^3-5x^2+6x+9
ight) \mathsf{d} \mathsf{x}$$

20. Prove that the curves $y^2 = 4x$ and $x^2 = 4y$ divide the area of the square bounded by x = 0, x = 4, y = 4 and y = 0 into three equal parts.

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21. Find the vector equation of the plane which contains the line of intersection of the planes $r(\hat{i} + \hat{j} + \hat{k}) = 6$ and $r.(2\hat{i} + 3\hat{j} + 4\hat{k}) = -5$ and the point (1, 1, 1).

22. Prove that the lines
$$\frac{x-2}{1} = \frac{y-4}{4} = \frac{z-6}{7}$$
 and $\frac{x+1}{3} = \frac{y+3}{5} = \frac{z+5}{7}$ are coplanar.

23. Prove that
$$\left(\overrightarrow{a}\times\hat{i}
ight)^2+\left(\overrightarrow{a}\times\hat{j}
ight)^2+\left(\overrightarrow{a}\times\hat{k}
ight)^2=2\overrightarrow{a}^2$$
 .

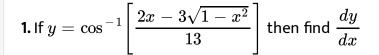
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24. Prove that the sum of the vectors represented by the sides of a

closed polygon taken in order is a zero vector.



Section C Answer Any One Questions



2. Show that the semivertical angle of a cone of given slant height is

 $an^1\sqrt{2}$ when its volume is maximum.

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3. Find the area between the curve $y^2 = 4x$ line x + y = 3 and Y-axis.

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4. Find the solution of the following differential equations:

(2x+3y-5)dy/dx+3x+2y-5-0

5. Evaluate
$$\int_{0}^{4} ig(x+e^{2x}ig) dx$$
, as limit of sum.

6. Find the equation of the plane through the intersection of the planes

$$\overrightarrow{r}.\left(\hat{i}+3\hat{j}
ight)-6=0$$
 and $\overrightarrow{r}.\left(3\hat{i}-\hat{j}-4\hat{k}
ight)=0$, whose

perpendicular distance from origin is unity.

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7.

$$\cos^{-1}\Big(rac{x}{a}\Big) = \cos^{-1}\Big(rac{y}{b}\Big) = heta, ext{ prove that } rac{x^2}{a^2} - rac{2xy}{ab} \cos heta + rac{y^2}{b^2} = \sin^2 heta$$

lf

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8. Prove that for any $f\colon X o Y,$ $foid_x=f=id_Y$ of.

9. Solve the following system of equations by the matrix inversion method

x + y + z = 4

2x - y + 3z + 1

3x + 2y - z = 1

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10. The probability that a student securing first division ia an examination is $\frac{1}{10}$. What is the probability that out of 100 students twenty pass in first division ?



11. Find the inverse of the following matrix using elementary

transformation :
$$\begin{bmatrix} 1 & 2 & 3 \\ 2 & 1 & 4 \\ 1 & 0 & 2 \end{bmatrix}$$