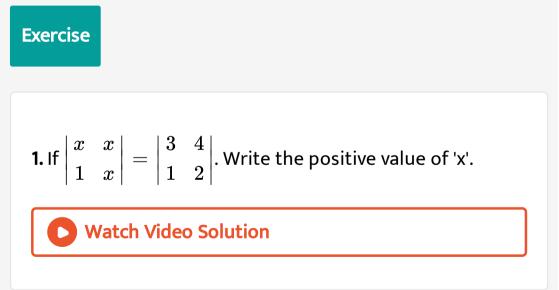




MATHS

BOOKS - MODERN PUBLICATION

MOCK TEST-2



2. Evaluate :
$$\int_0^{\frac{\pi}{2}} \frac{\sin^{\frac{3}{2}}x}{\sin^{\frac{3}{2}}x + \cos^{\frac{3}{2}}x} dx.$$

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3. Verify that
$$y = cx + \frac{a}{c}$$
 is a solution of:
 $y = x \frac{dy}{dx} + a \frac{dx}{dy}.$

4. If a line angles $90^\circ,\,135^\circ,\,45^\circ$ with the positive x,y and

z axis respectively, find its direction cosines.



5. For the matrix $A = \begin{bmatrix} 1 & 5 \\ 6 & 7 \end{bmatrix}$, verify that (A + A') is a

symmetric matrix.

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6. For the matrix
$$A = \begin{bmatrix} 1 & 5 \\ 6 & 7 \end{bmatrix}$$
, verify that

 $\left(A-A^{\,\prime}
ight)$ is a skew symmetric matrix.

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7. Solve the following eqations, using inverse of a matrix:

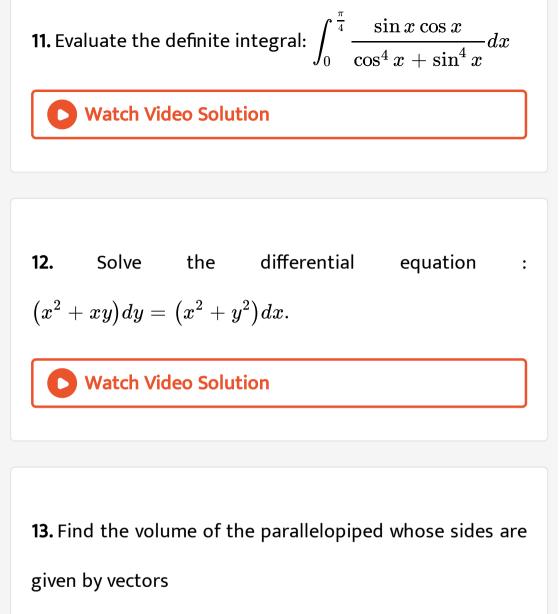
5x + 2y = 33x + 2y = 5

8. Differentiate
$$\cos^{-1} igg(rac{1-x^2}{1+x^2} igg), \, 0 < x < 1$$
. w.r.t.x

9. Find the equation of the normal to the curve $ay^2 = x^3 at \left(am^2, am^3
ight)$

10. Find local minimum value of the function f given by

$$f(x)=3+|x|,x\in R$$



$$2\hat{i} - 3\hat{j} + 4\hat{k},\, \hat{i} + 2\hat{j} - \hat{k} \,\,\, ext{and}\,\,\,3\hat{i} - \hat{j} + 2\hat{k}.$$

14. Prove that :
$$\tan^{-1}x + \tan^{-1}2\frac{x}{1-x^2} = \tan^{-1}\left(\frac{3x-x^3}{1-3x^2}\right), |x| < \frac{1}{\sqrt{3}}$$
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$$an^{-1}igg(rac{1-x}{1+x}igg) = rac{1}{2} an^{-1}x, x>0$$

16. If
$$A = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}$$
, verify that : $A^2 - 4A - 5I = O$

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17. Solve the following system of equations by matrix

method, where $x
eq 0, \, , y
eq 0, \, z
eq 0$: $rac{2}{x} - rac{3}{y} + rac{3}{z} = 10, rac{1}{x} + rac{1}{y} + rac{1}{z} = 10, rac{3}{x} - rac{1}{y} + rac{2}{z} = 13$

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18. If
$$x \neq y \neq z$$
 and $\begin{vmatrix} x & x^3 & x^4 - 1 \\ y & y^3 & y^4 - 1 \\ z & z^3 & z^4 - 1 \end{vmatrix} = 0$, then prove

 $\mathsf{that}: xyz(xy+yz+zx) = x+y+z$

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19. If
$$x^y = e^{x-y}, ext{ then prove that } rac{dy}{dx} = rac{\log x}{\left(1+\log x
ight)^2}$$

20. If
$$y=x\log\Bigl[(ax)^{-1}+a^{-1}\Bigr]$$
, prove that : $x(x+1)\dfrac{d^2y}{dx^2}+x\dfrac{dy}{dx}=y-1$

21. Evaluate :
$$\int rac{x^2}{(x^2+1)(3x^2+4)} dx$$

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22. Evaluate :
$$\int_{1}^{4} (3x^2 + 2x) dx$$
 as the limit of sum.

23. Prove that :
$$\int_0^{rac{\pi}{2}} \sin 2x \log \tan x dx = 0$$

24. Find the particular solution of the differential equation $(1+e^{2x})dy+(1+y^2)(e^x)dx=0$ given that y=1 when x=0

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25. Using vectors, find the area of the triangle having vertices A (1, 1, 1), B (1, 2, 3) and C (2, 3, 1).



26. Find the co-ordinates of the foot of the perpendicualr drawn from the point A(1,8,4) to the joining B(0,-1,3) and C(2,-3,-1).

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27. There are 40 scholars in a class, out of which 10 are sports- persons. Three scholars are selected at random out of them. Find the probability distribution for the selected persons who are sports-persons. Find the mean of the distribution.

28. let $A = N \times N$ and * be the binary operation on A defined by : (a,b) * (c,d) = (a+c,b+d)`. Show that * is commutative and associative. Find the identify element for * on A, if any.



29. Consider $r \to [4, \infty]$ given by $f(x) = x^2 + 4$. Show that f is invertible with the increase $f^{-1}off$ given by $f^{-1}(y) = \sqrt{y-4}$, where R is the set of all non-negative real numbers.

30. Find the points of local maximum and local minimum, if any, of the function: $f(x) = \sin x - \cos x, \; 0 < x < 2\pi$

. Also find the local maximum and local minimum values.

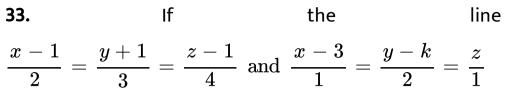
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31. Using integration find the area of region bounded by

the triangle where vertices are : (4,1),(6,6) and (8,4)

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32. If the sum of two unit vectors is a unit vector, show that the magnitude of their difference is $\sqrt{3}$.



intersect, then k is equal to



34. Convert 5283 meters to kilometers.



35. An urn contains 4 white and 3 red balls. Let 'X' be the number of red balls in a random draw of three balls. Find

the mean and variance of X.

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36. For three persons A, B and C the chances of being selected as Manager of a firm are in the ratio 4:1:2 respectively. The respective probabilities for them to introduce a radical change in marketing strategy are 0.3, 0.8 and 0.5. If the change does take place, find the probability that it is due to the appointment of B or C.

