



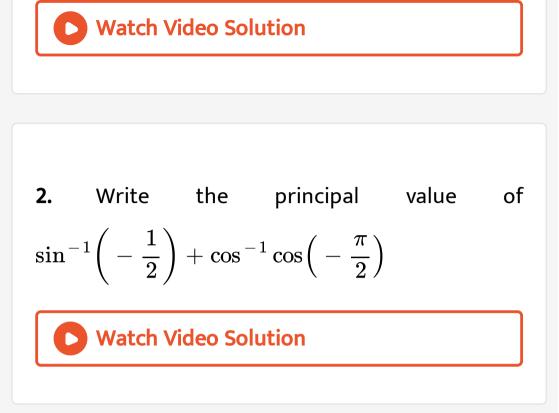
MATHS

BOOKS - SHARAM PUBLICATION

QUESTION PAPER 2018



1. Sets A and B have respectively m and n elements. The total number of relations from A to B is 64. If m < n and $m \neq 1$, write the values of m and n respectively.



3. If every element of a third order determinant of value 8 is multiplied by 2, then write the value of the new determinant.



4. Write the interval in which the function $f(x) = \sin^{-1}(2-x)$ is differentiable. Watch Video Solution

5. A balloon is pumped at the rate of 2 cm^3 / minute. Write the rate of increase of the surface area, when the radius is 0.5 cm.



6. Write the definite integral which is equal to

$$\lim_{n o\infty} \; rac{1}{n} \sum_{r=1}^n rac{r}{\sqrt{n^2+r^2}}$$

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7. If p and q are respectively degree and order of the differential equation $y = e^{dy/dx}$, then write the relation between p and q.



8. If
$$\left(\overrightarrow{a}\times\overrightarrow{b}
ight)^2+\left(\overrightarrow{a}\cdot\overrightarrow{b}
ight)^2=144$$
, write the

value of ab.

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9. Write the equations of the line 2x + z - 4 = 0 = 2y + z in the symmetrical form.

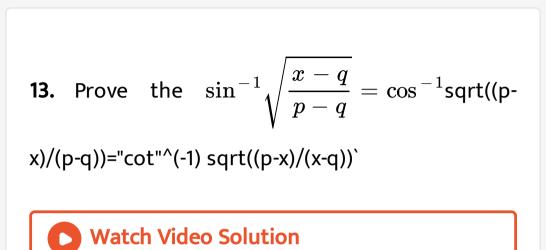
10. Let ~ be defined by (m,n)~(p,q) if mq=np where m, n, p, $q \in Z$ -{0}. Show that it is an equivalence relation.



11. Let
$$f(x) = \sqrt{x}$$
 and $g(x) = 1 - x^2$. Compute

fog and gof and find their natural domains.

12. Show that
$$\sin^{-1}\frac{4}{5} + 2\tan^{-1}\frac{1}{3} = \frac{\pi}{2}$$
.



14. Sole the following LPP graphically

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Minimize Z = 4x + 3y

subject to $2x + 5y \ge 10$ and $x, y \ge 0$.

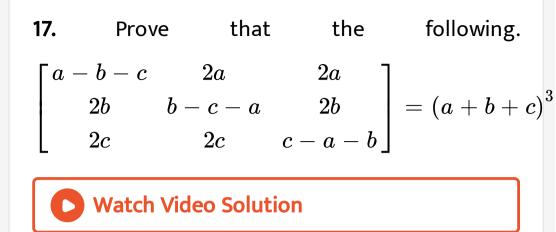
15. If A,B,C are matrices of order 2 imes 2 each and

$$2A+B+C=egin{bmatrix} 1&2\3&0\end{bmatrix}$$

 $A+B+C=egin{bmatrix} 0&1\2&1\end{bmatrix}$
 $A+B-C=egin{bmatrix} 1&2\1&0\end{bmatrix}$ find A,B and C.

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16. Find the inverse of the following matrix $\begin{bmatrix} 1 & 1 & 2 \\ 0 & 1 & 2 \\ 1 & 2 & 1 \end{bmatrix}$.

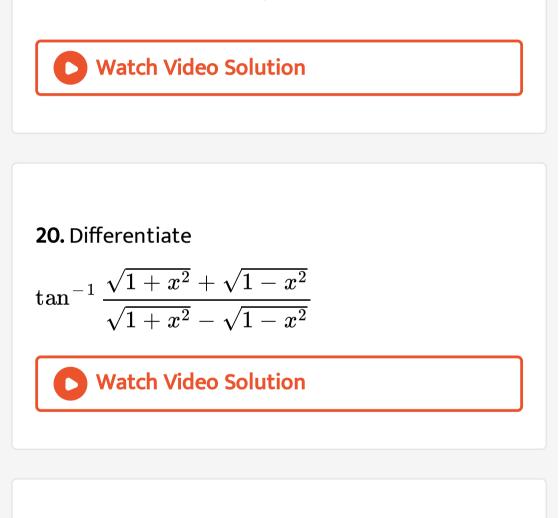


18. A bag A contains 2 white and 3 red balls and another bag B contains 4 white and 5 red balls. One ball is drawn at random from a bag chosen at random and it is found to be red. Find the probability that it was drawn from bag B.



19. If
$$P(A)=0.6,$$
 $Piggl(rac{B}{A}iggr)=0.5,$ find $P(A\cup B)$

when A and B are independent.

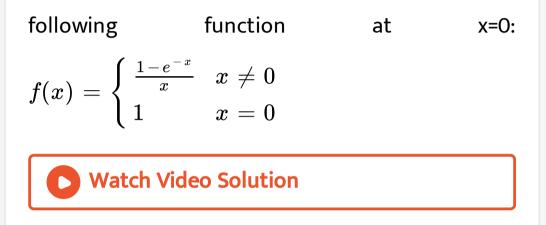


21. Differentiate $y = (\sin y)^{\sin 2x}$

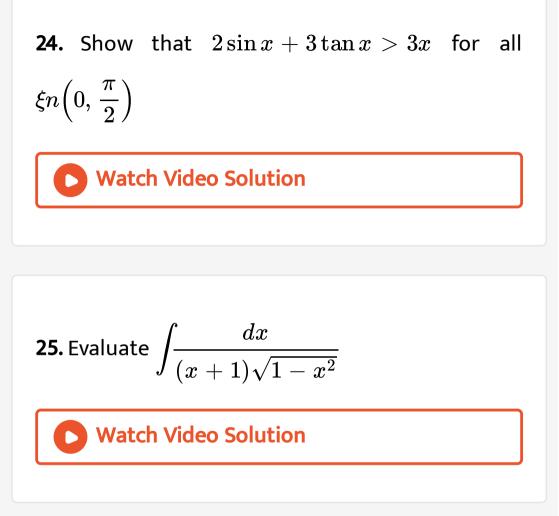
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22. Test the differentiability and continuity of the

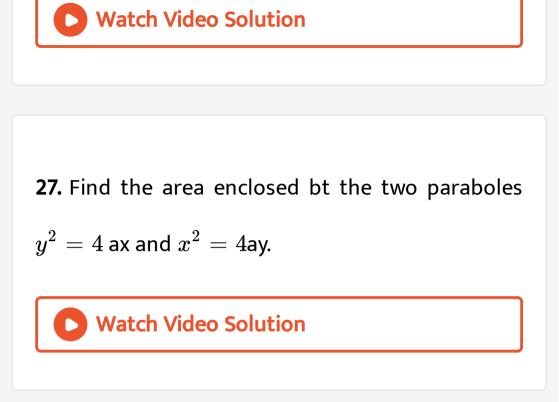


23. Show that the sum of the intercepts on the coordinate axes of any tangent to the curve $\sqrt{x} + \sqrt{y} = \sqrt{a}$ is constant.



26. Show that

$$\int_{0}^{1}rac{Inx}{\sqrt{1-x^{2}}}dx=rac{\pi}{2}Inrac{1}{2}$$



28. From the differential equation whose general

solution is $y = a \sin t + be^t$.

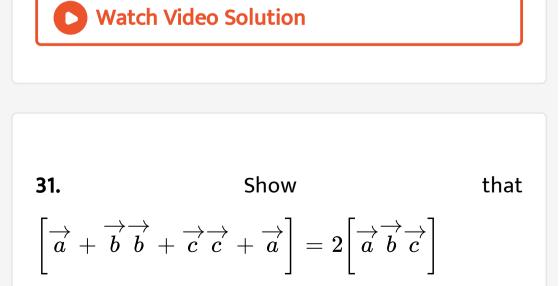
29. Solve the following differential equations

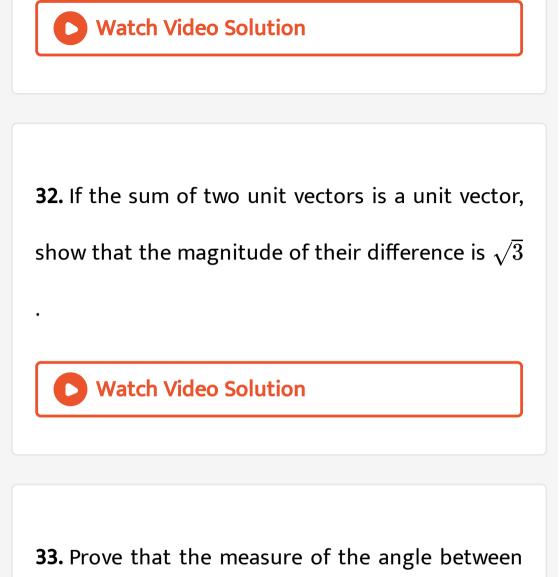
$$ig(1+y^2ig)dx+\Big(x-e^{- an^{-1}y}\Big)dy=0$$

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30. Find the area of the triangle ABC with vertices

A(1,2,4), B(3,1,-2) and C(4,3,1) by vector method.





two main diagonals of a cube is $\cos^{-1}rac{1}{3}.$

34. The position vectors of two points A and B are $3\hat{i} + \hat{j} + 2\hat{k}$ and $\hat{i} - 2\hat{j} - 4\hat{k}$, respectively. Find the equation of the plane passing through B and prependicular to AB.

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35. Let $f: X \to Y$ and $g: Y \to Z$. Prove that gof

is bijective if both f and g are bijective. Also prove

that $(gof)^{-1} = f^{-1}og^{-1}$.

36. In a triangle ABC if $m \angle A = 90^{\circ}$,

 $ext{ prove that } ext{ tan } (-1) ext{ b} / (ext{a+b}) + rac{ ext{tan } ^{-1}c}{a+b} = rac{\pi}{4}.$

where a,b,c, are sides of the triangle.



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

x + y + z = 4

2x - y + 3z = 1

and 3x + 2y - z = 1

38. Two cards are drawn successively with replacement from a well-shuffled deck of 52 cards. Find the probability distribution of the number of aces.

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39. By elementary operations, find A^{-1} for the

following:
$$A = egin{bmatrix} 1 & 1 & 0 \ 1 & -1 & 1 \ 1 & -1 & 2 \end{bmatrix}$$

40. If
$$x = \frac{1 - \cos^2 \theta}{\cos \theta}$$
, $y = \frac{1 - \cos^{2n} \theta}{\cos^n \theta}$ then
show that $\left(\frac{dy}{dx}\right)^2 = n^2 \left(\frac{y^2 + 4}{x^2 + 4}\right)$
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41. Find the coordinates of the point on the curve

$$x^2y - x + y = 0$$

where the slope of the tangent is maximum.

42. Evaluate:
$$\int \left(\frac{2\cos x + 7}{4 - \sin x} \right) dx$$





43. Find the solution of the following differential

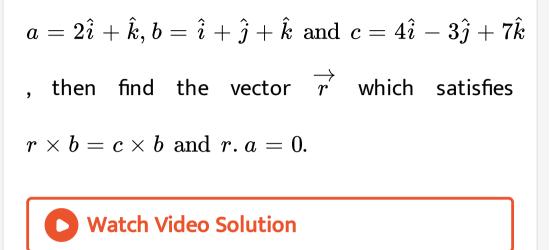
equations:

(4x+6y+5)dx-(2x+3y+4)dy=0

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44. Find the area enclosed by y = 4x - 1 and

$$y^2 = 2x.$$





$$\frac{x-3}{3} = \frac{y-8}{-1} = \frac{z-3}{1}$$
 and
$$\frac{x+3}{-3} = \frac{y-7}{2} = \frac{z-6}{4}$$
 Find also the

equation of the line of shortest distance.