INDIAN SCHOOL NIZWA
MATHEMATICS WORKSHEET 1

DATE:_____ NAME:_____ CLASS : XII

1.Evaluate : $\sec^{-1}(-\sqrt{2})$

2. Find 2A - 3B, if $A = \begin{matrix} 0 & -1 \\ 0 & 2 \end{matrix}$ and $B = \begin{matrix} 3 & 5 \\ 0 & 0 \end{matrix}$

3. If $\begin{matrix} 2 & 4 \\ 5x & 1 \end{matrix} = \begin{matrix} 2 & 4 \\ 6 & x \end{matrix}$ then find the value of x.

4.If a is a square matrix such that $A^TA = I$, find the value of A

5. Evaluate $\tan^{-1}\ 2\cos\ 2\sin^{-1}$ ½

6.Construct a 2 x 3 matrix $[a_{ij}]$, whose elements are given by $a_{ij} = ½ (2i – 3j)$

7.Using determinants, find the value of k so that the points (k,2),(1,5) and (2,4) are coliinear.

8.A dealer wishes to purchase fans and CFLs. He has only Rs.5760 to invest and has space for at most 20 items. A fan costa him Rs.360 and CFL costa Rs.240. He can sell a fan at a profit of Rs.22 and a CFL at a profit of Rs.18. How should he invest his money so as to maximize his profit. Formulate the above LPP mathematically.

9.Solve for x : $\cos(\tan^{-1}x) = \sin(\cot^{-1}¾)$

10. If $A = \begin{matrix} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \end{matrix}$ then prove that $A^n = \begin{matrix} 3^{n-1} & 3^{n-1} & 3^{n-1} \\ 3^{n-1} & 3^{n-1} & 3^{n-1} \\ 3^{n-1} & 3^{n-1} & 3^{n-1} \end{matrix}$

11. Express $\begin{matrix} 3 & 3 & -1 \\ -2 & -2 & 1 \\ -4 & -5 & 2 \end{matrix}$ as the sum of a symmetric and a skew symmetric matrix.

12. If $A = \begin{matrix} 1 & 0 \\ -1 & 7 \end{matrix}$, then find the value of k such that $A2 – 8A + kI = O$

13. Using the properties of determinants, prove that

$$\begin{vmatrix} a^2+1 & ab & ac \\ ab & b^2+1 & bc \\ ac & bc & c^2+1 \end{vmatrix} = 1+a^2+b^2+c^2$$

14. Prove that $\cot^{-1}\left(\frac{\sqrt{1+\sin x}+\sqrt{1-\sin x}}{\sqrt{1+\sin x}-\sqrt{1-\sin x}}\right) = \frac{x}{2}$

15. Ten students were selected from a school on the basis of values for giving awards and were divided into three groups. The first group comprises hard workers, the second has honest and the third contains obedient students. Double the number of students of the first group added to the number in the second group gives 13, while the combined strength of first and second group is four times that of third group. Using matrix method, find the number of students in each group. Other than the values mentioned above, suggest one more value, the school can consider for awards.

16. A dietician wishes to mi two types of food in such a way that the vitamin contents of the mixture contain at least 8 units of vitamin A and 10 units of vitamin C. Food I contains 2 units/kg of vitamin A and 1 unit/kg vitamin C while food II contains 1 unit/kg of vitamin A and 2 units/kg of vitamin C. It costs Rs 5 per kg to purchase food I and Rs 7 per kg to purchase food II. Determine the minimum cost of such a mixture. Formulate the above as LPP and solve it graphically.

INDIAN SCHOOL NIZWA
MATHEMATICS WORKSHEET 2

DATE:_____ NAME:_____ CLASS : XII

1. Write the principal value of $\tan^{-1}(\tan 2\pi/3)$

2. Prove that $2[\tan^{-1}1 + \tan^{-1}\frac{1}{2} + \tan^{-1}\frac{1}{3}] =$

3.If $e^y(x+1) = 1$, prove that $\frac{dy}{dx} = -e^y$

4. Prove that $\cot^{-1}\frac{\sqrt{1+\sin x} + \sqrt{1-\sin x}}{\sqrt{1+\sin x} - \sqrt{1-\sin x}} = x/2$

5. It is given that for the function $f(x) = x^3 - 6x^2 + ax + b$, Rolle's theorem holds in [1,3] with $c = 1 + \sqrt{3}$. Find the values of a and b.

6.Prove , using the properties of determinants.

$$\begin{vmatrix} 1+a & 1 & 1 \\ 1 & 1+b & 1 \\ 1 & 1 & 1+c \end{vmatrix} = abc\left(\frac{1}{a} + \frac{1}{b} + \frac{1}{c}\right)$$

7. If $x\sqrt{1+y} + y\sqrt{1+x} = 0$, find dy/dx

8. Find dy/dx when $x = a(\cos\theta + \theta\sin\theta)$, $y = a(\sin\theta - \theta\cos\theta)$ at $\theta = \pi/4$

9.Verify: A (adj A) = (adj A) A = A I for the matrix $A = \begin{bmatrix} 1 & -1 & 2 \\ 3 & 0 & -2 \\ 1 & 0 & 3 \end{bmatrix}$

10.One kind of cake requires 200 g of flour and 25 g of fat and another kind requires 100 g of flour and 50 g of fat. Find the maximum number of cakes which can be made from 5 kg of flour and 1 kg of fat assuming that there is no shortage of the other ingredients used in making the cakes.