

ST. VIVEKANAND PUBLIC SCHOOL, SADABAD

WORKSHEET

Class 12 - Mathematics

Section A

1.	Find values of k if area of triangle is 35 square units having vertices as (2, -6), (5, 4), (k, 4).	[2]
2.	If $A = \begin{bmatrix} \cos \theta & \sin \theta \\ -\sin \theta & \cos \theta \end{bmatrix}$ then for any natural number, find the value of Det (A ⁿ).	[2]
3.	Solve the system of linear equation, using matrix method $4x - 3y = 3$; $3x - 5y = 7$	[2]
4.	Using determinant show that the (5, 5), (- 5, 1) and (10, 7) points are collinear.	[2]
	$\begin{vmatrix} 2 & -3 & 5 \end{vmatrix}$	[2]
5.	In the determinant $\begin{vmatrix} 6 & 0 & 4 \end{vmatrix}$. Verify that $a_{11}A_{31} + a_{12}A_{32} + a_{13}A_{33} = 0$	
	1 5 -7	
	Section B	
6.	If A = $\begin{bmatrix} 1 & -1 & 1 \\ 2 & 1 & -3 \\ 1 & 1 & 1 \end{bmatrix}$, find A ⁻¹ and hence solve the system of linear equations	[3]
	x + 2y + z = 4,	
	-x + y + z = 0,	
	x - 3y + z = 2.	
7.	Find A^{-1} if $A = \begin{vmatrix} 0 & 1 & 1 \\ 1 & 0 & 1 \\ 1 & 1 & 0 \end{vmatrix}$ and show that $A^{-1} = \frac{A^2 - 3I}{2}$	[3]
8.	Using matrix method, solve the system of equations	[3]
	x + y - z = 1;	
	3x + y - 2z = 3;	

Section C

9. **Read the text carefully and answer the questions:**

Two farmers Ankit and Girish cultivate only three varieties of pulses namely Urad, Massor and Mung. The sale (in ₹) of these varieties of pulses by both the farmers in the month of September and October are given by the following matrices A and B.



September sales (in \mathbb{P}):

x - y - z = -1.

A =	(Urad N 10000 \50000	Masoor 20000 30000	$\begin{pmatrix} Mung \\ 30000 \\ 10000 \end{pmatrix}$	Ankit Girish	
Octob	er sales (in	₹):	10000 /		
A =	(Urad N 5000 20000	Masoor 10000 30000	$\begin{pmatrix} Mung \\ 6000 \\ 10000 \end{pmatrix}$	Ankit Girish	
(i)	The com	bined sale	es of Masoc	or in September and (October, for farmer Girish is:
	a)₹8	80000			b) ₹ 135000
	c) ₹ 4	0000			d) ₹ 90000
(ii)	The com	bined sale	es of Urad i	n September and Oc	tober, for farmer Ankit is:
	a)₹2	20000			b) ₹ 36000
	c) ₹ 3	80000			d) ₹ 15000
(iii)	Find dec	rease in sa	ales of Mun	ng from September to	October, for the farmer Ankit.
	a)₹1	0000			b) No Change
	c)₹3	80000			d) ₹ 24000
(iv)	If both th	ne farmers	receive 2%	6 profit on gross sale	s, then compute the profit for each farmer and for each
	variety s	old in Oct	ober.		

a)	$\begin{pmatrix} Urad \\ 150 \\ 400 \end{pmatrix}$	Masoor 200	Mung 220	Ankit Cini ch	b)	$\begin{pmatrix} Urad \\ 100 \\ 250 \end{pmatrix}$	Masoor 200	Mung 120	Ankit Oinish
c)	$\langle 400 \rangle$	200 Masoor	280 / $Mung \setminus$	Girish	d)	$\langle 250 \rangle$	200 Masoor	220) Mung \	Girish
-)	$\begin{array}{c} 100 \\ 400 \end{array}$	200 200	$\begin{array}{c} 120\\ 200 \end{array}$	$Ankit\ Girish$	-)	$\begin{array}{c} 100 \\ 400 \end{array}$	200 300	$\begin{pmatrix} 220\\ 200 \end{pmatrix}$	$Ankit\ Girish$

(v) Which variety of pulses has the highest selling value in the month of September for the farmer Girish?

a) Mung b) Masoor

d) All of these have same price

10. **Read the text carefully and answer the questions:**

c) Urad

Three schools A, B and C organized a mela for collecting funds for helping the rehabilitation of flood victims. They sold handmade fans, mats, and plates from recycled material at a cost of \gtrless 25, \gtrless 100 and \gtrless 50 each. The number of articles sold by school A, B, C are given below.



Article	School	А	В	С
Fans		40	25	35
Mats		50	40	50
Plates		20	30	40

(i) If P be a 3×3 matrix represent the sale of handmade fans, mats and plates by three schools A, B and C, then

a) P =	$egin{array}{c} Fans\ A\ 25\ 40\ 20\ \end{array}$	$\begin{array}{ccc} Mats & Plates \\ 35 & 40 \\ 40 & 50 \\ 30 & 20 \\ \end{array}$	b) P =	$egin{array}{c} Fans\ A\ B\ C\ 20 \end{array}$	$\begin{array}{ccc} Mats & Plates \\ 25 & 35 \\ 40 & 50 \\ 30 & 40 \\ \end{array}$
c) P =	$egin{array}{c} Fans\ A\ B\ 25\ C\ 35 \end{array}$	Mats Plates 50 20 40 30 50 40	d) P =	$egin{array}{c} Fans\ A\ 25\ B\ 35\ C\ 40 \end{array}$	Mats Plates 40 20 40 30 50 20

(ii) If Q be a 3×1 matrix represent the sale prices (in \mathbb{F}) of given products per unit, then

a) Fans	Mats	Plates	b)	25	Fans
$Q = \lfloor 25 \rfloor$	50	100]	Q =	100	Mats
				50	Plates
c) Fans	Mats	Plates	d)	25	Fans
$Q = \lfloor 25 \rfloor$	100	50]	Q =	50	Mats
				100	Plates

(iii) The funds collected by school A by selling the given articles is

a) ₹ 7875	b) ₹ 6125
c) ₹ 8000	d) ₹ 7000

(iv) The funds collected by school B by selling the given articles is

a) ₹ 8125	b) ₹ 7125
c) ₹ 5125	d) ₹ 6125

(v) The total funds collected for the required purpose is

a) ₹ 20000	b) ₹ 30000
c) ₹ 21000	d) ₹ 35000

11. **Read the text carefully and answer the questions:**

Two schools A and B want to award their selected students on the values of Honesty, Hard work and Punctuality. School A wants to award \mathbf{x} each, \mathbf{y} each and \mathbf{z} each for the three respective values to its 3, 2 and 1 students respectively with a total award money of \mathbf{z} 200. School B wants to spend \mathbf{z} 3100 to award its 4, 1 and 3 students on the respective values (by giving the same award money to the three values as school A). The total amount of award for one prize on each value is \mathbf{z} 1200.



(i) What is the award money for Honesty?

a) ₹350	b) ₹300
c) ₹400	d) ₹500

	(ii)	What is the award money for Punctuality?					
		a) ₹300	b) ₹500				
		c) ₹280	d) ₹450				
	(iii)	What is the award money for Hard work?					
		a) ₹550	b) ₹500				
		c) ₹400	d) ₹300				
	(iv)	If a matrix P is both symmetric and skew-symmetric	tric, then P is equal to				
		a) 0	b) none of these				
		c) 1	d) -1				
	(v)	If P and Q are two matrices such that PQ = Q and	$QP = P$, then $ Q^2 $ is equal to				
		a) 1	b) P				
		c) Q	d) 0				
		$\begin{bmatrix} 2 & -2 & -4 \end{bmatrix}$	<i>`</i>	[5]			
12.	Express	the matrix $B = \begin{bmatrix} -1 & 3 & 4 \\ 1 & 2 & 2 \end{bmatrix}$ as the sum of	a symmetric and a skew symmetric matrix.	1-1			
13.	If $P(x)$	If $P(x) = \begin{bmatrix} \cos x & \sin x \\ -\sin x & \cos x \end{bmatrix}$ then show that $P(x).P(y) = P(x + y) = P(y).P(x).$					
14.	Express	the matrix $B = \begin{bmatrix} 2 & -2 & -4 \\ -1 & 3 & 4 \\ 1 & 2 & 2 \end{bmatrix}$ as the sum of	f a symmetric and a skew-symmetric matrix.	[5]			
15.	Obtain	$\begin{bmatrix} 1 & -2 & -3 \end{bmatrix}$ the inverse of the following matrix:		[5]			
	$A = \left[ight.$	$\begin{bmatrix} 0 & 1 & 2 \\ 1 & 2 & 3 \\ 3 & 1 & 1 \end{bmatrix}$					
16.	Find the	e value of x, if $\begin{bmatrix} 1 & x & 1 \end{bmatrix} \begin{vmatrix} 1 & 3 & 2 \\ 2 & 5 & 1 \\ 15 & 3 & 2 \end{vmatrix} \begin{vmatrix} 1 \\ 2 \\ x \end{vmatrix} =$	0	[5]			
17.	Two scł	nools P and Q want to award their selected students	on the values of Tolerance, Kindness, and	[5]			
	Leadership. The school P wants to award Rs x each, Rs y each and Rs z each for the three respective values to 3,						
	2 and 1 students respectively with total award money of Rs2200.						
	School Q wants to spend Rs 3100 to award its 4, 1 and 3 students on the respective values (by giving the same						
	award money to the three values as school P). If the total amount of award for one prize on each value is						
	Rs1200	, using matrices, find the award money for each va	lue.				
18.	For the	matrix $A = \begin{bmatrix} 3 & 2 \\ 1 & 1 \end{bmatrix}$, find the numbers a and b su	$hat A^2 + aA + bI = 0.$	[5]			
19.	Find ad	joint of the matrix $\begin{vmatrix} 1 & -1 & 2 \\ 2 & 3 & 5 \\ -2 & 0 & 1 \end{vmatrix}$		[5]			

- 20. Show that the matrix, $A = \begin{bmatrix} 1 & 0 & -2 \\ -2 & -1 & 2 \\ 3 & 4 & 1 \end{bmatrix}$ satisfies the equation, $A^3 A^2 3A I_3 = 0$. Hence, find A^{-1} [5]
- 21. Solve the system of the following equations: (Using matrices): $\frac{2}{x} + \frac{3}{y} + \frac{10}{z} = 4; \frac{4}{x} - \frac{6}{y} + \frac{5}{z} = 1; \frac{6}{x} + \frac{9}{y} - \frac{20}{z} = 2;$