**DAV PUBLIC SCHOOL, THERMAL COLONY, PANIPAT**

**Class - XII (Maths)**

 **Sample Question Paper – 3**

 **Time : 3 Hrs. MM: 100**

 **General Instruction:**

a)Question 1-4 in Section A are very short answer type questions carrying 1 mark each.

 b)Question 5-12 in Section B are short answer type questions carrying 2 marks each.

 c)Question 13-23 in Section C are long answer-I type questions carrying 4 marks each.

d)Question 24-29 in Section D are long answer-II type questions carrying 6 marks each.

**Section - A**

1. If A is square matrix of order 3 such that |A|= -1 then write the value of |-A|
2. Write the general solution of the differential equation
3. Write the integrating factor of
4. Find the projection of , if = 8 and = 2

 **Section - B**

1. Find the principal value of tan⎼1⎼ cot ⎼1(⎼√3)
2. Solve for x : cos (tan⎼1x) = sin (cot ⎼1
3. Find equation of the line joining (1, 2) and (3, 6) using determinants.
4. Evaluate
5. Evaluate
6. Form the differential equation of the family of circles touching the y - axis at origin.
7. Write a unit rector in the direction of = 2.
8. If X has a Binomial distribution B , then write P(X = 1 )

 **Section - C**

1. There are 3 families A, B and C. The number of men, women and children in these families are as under.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Men | Women | Children |
| Family A | 2 | 3 | 1 |
| Family B | 2 | 1 | 3 |
| Family C | 4 | 2 | 6 |

Daily expenses of men, women and children are Rs 200, Rs 150 and Rs 200 respectively. Only men and women earn and children do not. Using matrix multiplication, calculate the daily expenses of each family. What impact does more children in the family create on the society?

 OR

If A = , Find x and y such that A2 + xI = yA.

1. Find the value of k so that function f is continuous at the indicated point :

f (x) =

1. Verify the Rolle's theorem for the function

f (x) = Sin4x + Cos4x in

1. Show that the rectangle of maximum perimeter which can be inscribed in a circle of radius r is the square of side r√2.
2. Find

 OR

Evaluate: as limit of a sum.

1. Evaluate :
2. Find the general solution of the differential Equation

 OR

Solve the differential equation: x2

1. If and are unit vectors inclined at angle , then prove that sin
2. Find the shortest distance between the following two lines.
3. A and B throw a die alternative till one them gets a number greater than 4 and wins the game. If A starts first, what is the probability of B winning.
4. A die is tossed twice. A 'success' is getting an even number on a toss. Find the variance of the number of successes.

 **Section - D**

1. Show that each of the relation R in the set A

A = { x ∊ Z : o ≤ x ≤ 12 } given by

(i) R = { (a, b) : |a - b| is a multiple of 4}

(ii) R = { (a, b) : a = b } is an equivalence relation.

Find the set of all elements related to 1 in each case.

1. Using the properties of determinants, prove the following.

 = 2 (a+b+c) (ab+bc+ca ⎼ a2 ⎼ b2 ⎼ c2)

 OR

If A = , Find A⎼1. Using A⎼1, solve the following system of equations :

2x + 6y ⎼ 2 = 0, 2x ⎼ y + z = ⎼3, 3x ⎼ z = 0

1. Find the maximum area of an isosceles triangle inscribed in the ellipse, with its vertex at one end of the major axis.
2. Using integration, find the area of the triangular region whose sides have the equations y = 2x + 1 , y = 3x + 1 , x = 4

 OR

Using integration, find the area bounded by the curves y = |x - 1|, and y = 3 ⎼ |x|

1. Find the image of the line in the plane 2x ⎼ y + z + 3 = 0

 OR

A line passes through ( 2, ⎼1, 3 ) and is perpendicular to the line.

Obtain its equation

1. A factory owner purchases two types of machine A and B for his factory. The requirements and the limitations for the machines are as follows :

|  |  |  |
| --- | --- | --- |
| Machine | Area Occupied | Labour Force |
|  |  | On each machine | Output in units |
| A | 1000m2 | 12 men | 60 |
| B | 1200 ms | 8 men | 40 |

He has maximum area 9000m2 available and 72 skilled labour who can operate both the machines. How many machines of each type should he buy to maximize the daily output.

**Answer Key (SP-3)**

1. 1
2. y = Cx
3. 8/7
4. ⎼π/2
5. x =

1. 2x ⎼ y = 0
2. + C
3. 2xy y1 + x2 ⎼ y2 = 0
4. Daily Expenses for family A = 1050 Rs

 Daily Expenses for family B = 1150 Rs

 Daily Expenses for family C = 2300 Rs

 Value = More children in family will increase the expenses of family, which

 will affect the economy of society.

 Or

 x = 8 , y = 8

1. k = ⎼1
2. C =
3. --------
4. x ⎼ log |x| + |x2+1| ⎼ tan⎼1 x + C

 OR

 21+e4 –e

1. 1
2. y = { 2Cos2x + Sin2x} + Ce3x

 OR

1. -----------
2. 2/5
3. 1/2
4. {1}
5. OR x =
6. Area = 9
7. 8 sq. units

 OR

 4 sq. units

1. (⎼3, 5, 2 ) ,

 OR

1. ⇒ Z = 360