

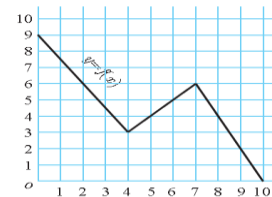
## SSLC – MATHEMATICS IMPORTANT FIVE MARKS

### TYPE 1

- Let  $A = \{1,2,3,4\}$  and  $B = \{2,5,8,11,14\}$  be two sets. Let  $f: A \rightarrow B$  be a function given by  $f(x) = 3x - 1$ . Represent this function (i) by arrow diagram (ii) in a table form (iii) as a set of ordered pairs (iv) in a graphical form.
- Let  $f: A \rightarrow B$  be a function defined by  $f(x) = \frac{x}{2} - 1$ , where  $A = \{2,4,6,10,12\}$ ,  $B = \{0,1,2,4,5,9\}$ . Represent  $f$  by (i) set of ordered pairs (ii) a table (iii) an arrow diagram (iv) a graph.
- Represent the function  $f = \{(1,2), (2,2), (3,2), (4,3), (5,4)\}$  through (i) an arrow diagram
4. Represent each of the given relations by (a) an arrow diagram, (b) a graph and (c) a set in roster form, wherever possible.  
(i)  $\{(x, y) / x=2y, x \in \{2,3,4,5\}, y \in \{1,2,3,4\}\}$  (ii)  $\{(x, y) / y = x+3, x, y \text{ are natural numbers } < 10\}$

### TYPE 2

- If the function  $f: R \rightarrow R$  is defined by  $f(x) = \begin{cases} 2x + 7 & \text{if } x < -2 \\ x^2 - 2 & \text{if } -2 \leq x < 3 \\ 3x - 2 & \text{if } x \geq 3 \end{cases}$   
then the values of (i)  $f(4)$  (ii)  $f(-2)$  (iii)  $f(4) + 2f(1)$  (iv)  $\frac{f(1)-3f(4)}{f(-3)}$ .
- If the function  $f$  is defined by  $f(x) = \begin{cases} x + 2 & \text{if } x > 1 \\ 2 & \text{if } -1 \leq x \leq 1 \\ x - 1 & \text{if } -3 < x < -1 \end{cases}$
- A function  $f: [-5,9] \rightarrow R$  is defined as follows:  $f(x) = \begin{cases} 6x + 1 & \text{if } -5 \leq x < 2 \\ 5x^2 - 1 & \text{if } 2 \leq x < 6 \\ 3x - 4 & \text{if } 6 \leq x \leq 9 \end{cases}$   
Find (i)  $f(-3) + f(2)$  (ii)  $f(7) - f(1)$  (iii)  $2f(4) + f(8)$  (iv)  $\frac{2f(-2)-f(6)}{f(4)+f(-2)}$ .
- Given that  $f(x) = \begin{cases} \sqrt{x-1}; & x \geq 1 \\ 4; & x < 1 \end{cases}$   
Find (i)  $f(0)$  (ii)  $f(3)$  (iii)  $f(a+1)$  in terms of  $a$ . (given that  $a \geq 0$ ).
- Given  $f(x) = 2x - x^2$ , find (i)  $f(1)$  (ii)  $f(x+1)$  (iii)  $f(x) + f(1)$ .
- Given the function  $f: x \rightarrow x^2 - 5x + 6$ , evaluate (i)  $f(-1)$  (ii)  $f(2a)$  (iii)  $f(2)$  (iv)  $f(x-1)$
- A function  $f$  is defined by  $f(x) = 2x - 3$ . (i) Find  $\frac{f(0)+f(1)}{2}$ . (ii) Find  $x$  such that  $f(x)=0$ .  
(iii) Find  $x$  such that  $f(x) = x$ . (iv) Find  $x$  such that  $f(x) = f(1-x)$ .
4. A graph representing the function  $f(x)$  is given in the figure,  
it is clear that  $f(9) = 2$ . (i) Find the following values of the function  
(a)  $f(0)$  (b)  $f(7)$  (c)  $f(2)$  (d)  $f(10)$   
(ii) For what value of  $x$  is  $f(x) = 1$ ?  
(iii) Describe the following (a) Domain (b) Range.  
(iv) What is the image of 6 under  $f$ ?
- If  $f(x) = \frac{x-1}{x+1}$ ,  $x \neq -1$  show that  $f(f(x)) = \frac{-1}{x}$ , provided  $x \neq 0$ .



## TYPE 3

1. Consider the functions  $f(x)$ ,  $g(x)$ ,  $h(x)$  are given below. Show that  $(f \circ g) \circ h = f \circ (g \circ h)$  in each case. (i)  $f(x) = x - 1$ ,  $g(x) = 3x + 1$  and  $h(x) = x^2$

(ii)  $f(x) = x^2$ ,  $g(x) = 2x$  and  $h(x) = x + 4$ .

(iii)  $f(x) = x - 4$ ,  $g(x) = x^2$  and  $h(x) = 3x - 5$ .

(iv)  $f(x) = 2x + 3$ ,  $g(x) = 1 - 2x$  and  $h(x) = 3x$ .

(V).  $f(x) = x^2$ ,  $g(x) = 3x$  and  $h(x) = x - 2$ ,

2. Find  $x$  if  $gff(x) = fgg(x)$ , given  $f(x) = 3x + 1$  and  $g(x) = x + 3$ .

3. The functions  $f$  and  $g$  are defined by  $f(x) = 6x + 8$ ;  $g(x) = \frac{x-2}{3}$

(i) Calculate the value of  $gg(\frac{1}{2})$  (ii) Write an expression for  $gf(x)$  in its simplest form.

## TYPE 4

1. Let  $A = \{x \in \mathbb{N} / 1 < x < 4\}$ ,  $B = \{x \in \mathbb{W} / 0 \leq x < 2\}$  and  $C = \{x \in \mathbb{N} / x < 3\}$ . Then verify that (i)  $A \times (B \cup C) = (A \times B) \cup (A \times C)$  (ii)  $A \times (B \cap C) = (A \times B) \cap (A \times C)$

2. If  $A = \{5, 6\}$ ,  $B = \{4, 5, 6\}$ ,  $C = \{5, 6, 7\}$ , Show that  $A \times A = (B \times B) \cap (C \times C)$ .

3. Given  $A = \{1, 2, 3\}$ ,  $B = \{2, 3, 5\}$ ,  $C = \{3, 4\}$  and  $D = \{1, 3, 5\}$ , check if  $(A \cap C) \times (B \cap D) = (A \times B) \cap (C \times D)$  is true?

4. Let  $A = \{x \in \mathbb{W} / x < 2\}$ ,  $B = \{x \in \mathbb{N} / 1 < x \leq 4\}$  and  $C = \{3, 5\}$ . Verify that

(i)  $A \times (B \cup C) = (A \times B) \cup (A \times C)$  (ii)  $A \times (B \cap C) = (A \times B) \cap (A \times C)$

(iii)  $(A \cup B) \times C = (A \times C) \cup (B \times C)$

## TYPE 5

1. Find the sum of all natural numbers between 300 and 600 which are divisible by 7.

2. Find the sum of all odd positive integers less than 450.

3. Find the sum of all natural numbers between 602 and 902 which are not divisible by 4.

## TYPE 6

1. Find the sum to  $n$  terms of the series i)  $5 + 55 + 555 + \dots$

(ii)  $3 + 33 + 333 + \dots$  to  $n$  terms.

(iii)  $0.4 + 0.44 + 0.444 + \dots$  to  $n$  terms

## TYPE 7

Find the square root of the following (i)  $(4x^2 - 9x + 2)(7x^2 - 13x - 2)(28x^2 - 3x - 1)$

(ii)  $(2x^2 + \frac{17}{6}x + 1) (\frac{3}{2}x^2 + 4x + 2) (\frac{4}{3}x^2 + \frac{11}{3}x + 2)$

(iii)  $[\sqrt{15}x^2 + (\sqrt{3} + \sqrt{10})x + \sqrt{2}][\sqrt{5}x^2 + (2\sqrt{5} + 1)x + 2][\sqrt{3}x^2 + (\sqrt{2} + 2\sqrt{3})x + 2\sqrt{2}]$

## TYPE 8

1. Find the square root of

- 1)  $64x^4 - 16x^3 + 17x^2 - 2x + 1$
- (2)  $x^4 - 12x^3 + 42x^2 - 36x + 9$
- (3)  $37x^2 - 28x^3 + 4x^4 + 42x + 9$
- (4)  $16x^4 + 8x^2 + 1$
- (5)  $121x^4 - 198x^3 - 183x^2 + 216x + 144$
- (6)  $289x^4 - 612x^3 + 970x^2 - 684x + 361$ .
- (7)  $4\frac{x^2}{y^2} + 20\frac{x}{y} + 13 - 30\frac{y}{x} + 9\frac{y^2}{x^2}$
- (8)  $\frac{x^2}{y^2} - 10\frac{x}{y} + 27 - 10\frac{y}{x} + \frac{y^2}{x^2}$

2. Find the values of  $a$  and  $b$  if the following polynomials are perfect squares

- (i)  $4x^4 - 12x^3 + 37x^2 + bx + a$  (ii)  $ax^4 + bx^3 + 361x^2 + 220x + 100$  (iii)  $9x^4 + 12x^3 + 28x^2 + ax + b$  is

4. Find the values of  $m$  and  $n$  if the following expressions are perfect squares

- (i)  $\frac{1}{x^4} - \frac{6}{x^3} + \frac{13}{x^2} + \frac{m}{x} + n$  (ii)  $x^4 - 8x^3 + mx^2 + nx + 16$

## TYPE 9

1. If  $A = \begin{pmatrix} 1 & 2 & 1 \\ 2 & -1 & 1 \end{pmatrix}$  and  $B = \begin{pmatrix} 2 & -1 \\ -1 & 4 \\ 0 & 2 \end{pmatrix}$  show that  $(AB)^T = B^T A^T$ .

2. If  $A = \begin{pmatrix} 5 & 2 & 9 \\ 1 & 2 & 8 \end{pmatrix}$ ,  $B = \begin{pmatrix} 1 & 7 \\ 1 & 2 \\ 5 & -1 \end{pmatrix}$  verify that  $(AB)^T = B^T A^T$ .

3. If  $A = \begin{pmatrix} 3 & 1 \\ -1 & 2 \end{pmatrix}$  show that  $A^2 - 5A + 7I_2 = 0$

## TYPE 10

1. If  $A = \begin{pmatrix} 1 & -1 & 2 \\ 2 & 1 \\ 1 & 3 \end{pmatrix}$ ,  $B = \begin{pmatrix} 1 & -1 \\ 2 & 1 \\ 1 & 3 \end{pmatrix}$  and  $C = \begin{pmatrix} 1 & 2 \\ 2 & -1 \end{pmatrix}$  show that  $(AB)C = A(BC)$ .

2. If  $A = \begin{pmatrix} 1 & 1 \\ -1 & 3 \end{pmatrix}$ ,  $B = \begin{pmatrix} 1 & 2 \\ -4 & 2 \end{pmatrix}$ ,  $C = \begin{pmatrix} -7 & 6 \\ 3 & 2 \end{pmatrix}$  verify that  $A(B+C) = AB+AC$ .

3. Given  $A = \begin{pmatrix} 1 & 3 \\ 5 & -1 \end{pmatrix}$ ,  $B = \begin{pmatrix} 1 & -1 & 2 \\ 3 & 5 & 2 \end{pmatrix}$ ,  $C = \begin{pmatrix} 1 & 3 & 2 \\ -4 & 1 & 3 \end{pmatrix}$  verify that  $A(B+C) = AB+AC$ .

4. If  $A = \begin{pmatrix} 2 & 5 \\ 4 & 3 \end{pmatrix}$ ,  $B = \begin{pmatrix} 1 & -3 \\ 2 & 5 \end{pmatrix}$  find  $AB$ ,  $BA$  and check if  $AB = BA$ ?

5.  $A = \begin{pmatrix} 1 & 2 \\ 1 & 3 \end{pmatrix}$ ,  $B = \begin{pmatrix} 4 & 0 \\ 1 & 5 \end{pmatrix}$ ,  $C = \begin{pmatrix} 2 & 0 \\ 1 & 2 \end{pmatrix}$  Show (i)  $A(BC) = (AB)C$

(ii)  $(A - B)C = AC - BC$  (iii)  $(A - B)^T = A^T - B^T$ .

6. If  $A = \begin{pmatrix} \cos \theta & 0 \\ 0 & \cos \theta \end{pmatrix}$ ,  $B = \begin{pmatrix} \sin \theta & 0 \\ 0 & \sin \theta \end{pmatrix}$  then show that  $A^2 + B^2 = I$

7. If  $A = \begin{pmatrix} a & b \\ c & d \end{pmatrix}$  and  $I = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$  show that  $A^2 - (a+d)A = (bc - ad) I_2$ .

8. Given  $A = \begin{pmatrix} p & 0 \\ 0 & 2 \end{pmatrix}$ ,  $B = \begin{pmatrix} 0 & -q \\ 1 & 2 \end{pmatrix}$ ,  $C = \begin{pmatrix} 2 & -2 \\ 2 & 2 \end{pmatrix}$  and if  $BA = C^2$ , find  $p$  and  $q$ .

9.  $A = \begin{pmatrix} 3 & 0 \\ 4 & 5 \end{pmatrix}$ ,  $B = \begin{pmatrix} 6 & 3 \\ 8 & 5 \end{pmatrix}$ ,  $C = \begin{pmatrix} 3 & 6 \\ 1 & 1 \end{pmatrix}$  find the matrix  $D$ , such that  $CD - AB = 0$ .

## TYPE 11

**State and prove the following theorems.**

1. Basic Proportionality Theorem (BPT) (or) Thales Theorem.
2. Angle Bisector Theorem
3. Pythagoras Theorem
4. Alternate Segment Theorem

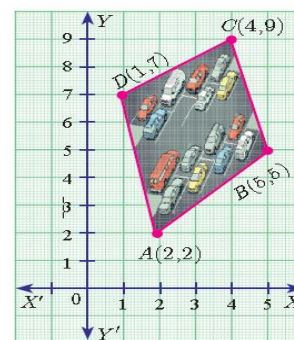


Fig. 5.14

## TYPE 12

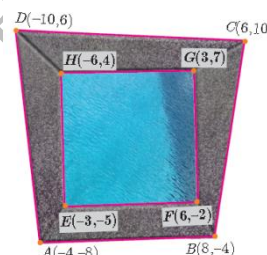
1. Find the area of the quadrilateral formed by the points

- (8,6), (5,11), (-5,12) and (-4,3).
- (-9,-2), (-8,-4), (2,2) and (1,-3)
- (-9,0), (-8,6), (-1,-2) and (-6,-3)

2. The given diagram shows a plan for constructing a new parking lot at a campus.

It is estimated that such construction would cost Rs1300 per sq. ft. What will be the total cost for making the parking lot?

3. In the fig, the quadrilateral swimming pool shown is surrounded by concrete patio. Find the area of the patio.



4. Find the value of  $k$ , if the area of a quadrilateral is 28 sq. units, whose vertices are (-4,-2), (-3, $k$ ), (3,-2) and (2,3).

5. If vertices of a quadrilateral are at  $A(-5,7)$ ,  $B(-4, k)$ ,  $C(-1, -6)$  and  $D(4,5)$  and its area is 72 sq. units. Find the value of  $k$ .

## TYPE 13

1. Find the area of the triangle whose vertices are 1).(-3, 5), (5, 6) and ( 5, - 2).

2) (1,-1), (-4,6) and (-3,-5)      3. (-10,-4), (-8,-1) and (-3,-5)

Vertices of given triangles are taken in order and their areas are provided aside. In each case, find the value of 'p'.

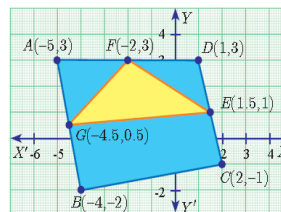
S.No.	Vertices	Area (Sq. units)
(i)	(0,0), (p, 8), (6,2)	20
(ii)	(p, p), (5,6), (5,-2)	32

3. Let  $P(11,7)$ ,  $Q(13.5, 4)$  and  $R(9.5, 4)$  be the midpoints of the sides  $AB$ ,  $BC$  and  $AC$  respectively of  $\triangle ABC$ . Find the coordinates of the vertices  $A$ ,  $B$  and  $C$ . Hence find the area of  $\triangle ABC$  and compare this with area of  $\triangle PQR$ .

4. A triangular shaped glass with vertices at  $A(-5, - 4)$ ,

$B(1,6)$  and  $C(7,-4)$  has to be painted. If one bucket of paint covers 6 sq. ft., how many buckets of paint will be required to paint the whole glass, if only one coat of paint is applied.

5. In the figure, find the area of (i)  $\triangle AGF$  (ii)  $\triangle FED$  (iii) quadrilateral  $BCEG$ .



- The area of a triangle is 5 sq. units. Two of its vertices are (2,1) and (3,-2). The third vertex is (x, y) where  $y = x + 3$ . Find the coordinates of the third vertex.
- Find the area of a triangle formed by the lines  $3x + y - 2 = 0$ ,  $5x + 2y - 3 = 0$  and  $2x - y - 3 = 0$ .

### TYPE 14

- Show that the points P(-1.5, 3), Q(6, -2), R(-3,4) are collinear.
- If the points P(-1,-4), Q(b,c) and R(5,-1) are collinear and if  $2b + c = 4$ , then find the values of b and c.
- Determine whether the set of points are collinear? (i)  $(\frac{-1}{2}, 3)$ , (-5,6) and (-8,8)  
(ii) (a, b+c), (b, c+a) and (c, a+b)
- In each of the following, find the value of 'a' for which the given points are collinear.  
(i) (2,3), (4,a) and (6,-3)      (ii) (a, 2-2a), (-a+1, 2a), and (-4-a, 6-2a)
- If the points A(-3,9), B(a, b) and C(4,-5) are collinear and if  $a+b=1$ , then find a and b.

### TYPE 15

- Show that given points form a parallelogram A(2.5,3.5), B(10,-4), C(2.5,-2.5) and D(-5,5).
- If the points A (2,2), B (-2,-3), C (1,-3) and D (x, y) form a parallelogram, then find the value of x and y.
- Let A(3,-4), B(9,-4), C(5,-7) and D(7,-7). Show that ABCD is a trapezium.
- A quadrilateral has vertices at A(-4,-2), B(5,-1) C(6,5) and D(-7,6). Show that the mid-points of its sides form a parallelogram
- PQRS is a rectangle formed by joining points P(-1, -1), Q(-1,4), R(5,4) and S(5, -1).
- A, B, C and D are mid-points of PQ, QR, RS and SP respectively. Is the quadrilateral ABCD is a square, a rectangle or a rhombus? Justify your answer.
- Without using distance formula, show that the points (-2, -1), (4,0), (3,3) and (-3,2) are vertices of a parallelogram.

### TYPE 16

- Find the equation of the median and altitude of  $\Delta ABC$  through A where the vertices are A(6,2), B(-5,-1) and C(1,9).
- A(-3,0), B(10,-2) and C(12,3) are the vertices of  $\Delta ABC$ . Find the equation of the altitude through A and B.

### TYPE 17

- Find the number of coins, 1.5cm in diameter and 2mm thick, to be melted to form a right circular cylinder of height 10cm and diameter 4.5cm.
- A right circular cylindrical container of base radius 6cm and height 15 cm is full of ice cream. The ice cream is to be filled in cones of height 9cm and base radius 3cm, having a hemispherical cap. Find the number of cones needed to empty the container.
- A metallic sphere of radius 16cm is melted and recast into small spheres each of radius 2cm. how many small spheres can be obtained?

## TYPE 18

1. A solid right circular cone of diameter 14cm and height 8cm is melted to form a hollow sphere. If the external diameter of the sphere is 10cm, find the internal diameter.
2. Seenu's house has an overhead tank in the shape of a cylinder. This is filled by pumping water from a sump (underground tank) which is in the shape of a cuboid. The sump has dimensions  $2\text{m} \times 1.5\text{m} \times 1\text{m}$ . The overhead tank has its radius of 60cm and height 105cm. Find the volume of the water left in the sump after the overhead tank has been completely filled with water from the sump which has been full, initially.
3. The internal and external diameter of a hollow hemispherical shell are 6cm and 10cm respectively. If it is melted and recast into a solid cylinder of diameter 14cm, then find the height of the cylinder.
4. A solid sphere of radius 6cm is melted into a hollow cylinder of uniform thickness. If the external radius of the base of the cylinder is 5cm and its height is 32cm, then find the thickness of the cylinder.
5. A hemispherical bowl is filled to the brim with juice. The juice is poured into a cylindrical vessel whose radius is 50% more than its height. If the diameter is same for both the bowl and the cylinder then find the percentage of juice that can be transferred from the bowl into the cylindrical vessel.
6. A hollow metallic cylinder whose external radius is 4.3cm and internal radius is 1.1cm and whole length is 4cm is melted and recast into a solid cylinder of 12cm long. Find the diameter of solid cylinder

## TYPE 19

1. Find the coefficient of variation of 24, 26, 33, 37, 29, 31.
2. The time taken (in minute) to complete a homework by 8 students in a day are given by 38, 40, 47, 44, 46, 43, 49, 53. Find the coefficient of variation
3. The temperature of two cities A and B in a winter season are given below. Find which city is more consistent in temperature changes?

Temperature of city A (in degree Celsius)	18	20	22	24	26
Temperature of city B (in degree Celsius)	11	14	15	17	18

4. The consumption of number of guava and orange on a particular week by a family are given below. Which fruit is consistently consumed by the family?

Number of Guavas	3	5	6	4	3	5	4
Number of Oranges	1	3	7	9	2	6	2

5. Prices of peanut packets in various places of two cities are given below. In which city, prices were more stable?

Prices in city A	20	22	19	23	16
Prices in city B	10	20	18	12	15

5. The total marks scored by two students Sathya and Vidhya in 5 subjects are 460 and 480 with standard deviation 4.6 and 2.4 respectively. Who is more consistent in performance?
6. The mean and standard deviation of marks obtained by 40 students of a class in three subjects Mathematics, Science and Social science are given. Which of the three subjects shows highest variation and which shows lowest variation in marks?

Subject	Mean	SD
Mathematics	56	12
Science	65	14
Social Science	60	10

## TYPE 20

- The number of televisions sold in each day of a week are 13, 8, 4, 9, 7, 12, 10. Find its standard deviation.
- The amount of rainfall in a particular season for 6 days are given as 17.8 cm, 19.2cm, 16.3cm, 12.5cm, 12.8cm and 11.4cm. Find its standard deviation.
- The marks scored by 10 students in a class test are 25, 29, 30, 33, 35, 37, 38, 40, 44, 48. Find the standard deviation
- The amount that the children have spent for purchasing some eatables in one day trip of a school are 5, 10, 15, 20, 25, 30, 35, 40. Using step deviation method, find the standard deviation of the amount they have spent.
- Find the standard deviation of the following data 7, 4, 8, 10, 11. Add 3 to all the values then find the standard deviation for the new values.
- Find the standard deviation of the data 2, 3, 5, 7, 8. Multiply each data by 4. Find the standard deviation of the new values.
- A teacher asked the students to complete 60 pages of a record note book. Eight students have completed only 32, 35, 37, 30, 33, 36, 35 and 37 pages. Find the standard deviation of the pages yet to be completed by them.
- Find the variance and standard deviation of the wages of 9 workers given below: Rs.310, Rs.290, Rs.320, Rs.280, Rs.300, Rs.290, Rs.320, Rs.310, Rs.280.

## TYPE 21

- 48 students were asked to write the total number of hours per week they spent on watching television. With this information find the standard deviation of hours spent for watching television.

$x$	6	7	8	9	10	11	12
$f$	3	6	9	13	8	5	4

- The marks scored by the students in a slip test are given below. Find the standard deviation of their marks.

$x$	4	6	8	10	12
$f$	7	3	5	9	5

- The rainfall recorded in various places of five districts in a week are given below. Find its SD.

Rainfall (in mm)	45	50	55	60	65	70
Number of places	5	13	4	9	5	4

- Marks of the students in a particular subject of a class are given below. Find its SD.

Marks	0-10	10-20	20-30	30-40	40-50	50-60	60-70
Number of students	8	12	17	14	9	7	4

- In a study about viral fever, the number of people affected in a town was noted as. Find its SD.

Age in years	0-10	10-20	20-30	30-40	40-50	50-60	60-70
Number of people affected	3	5	16	18	12	7	4

- The measurement of the diameters (in cm) of the plates prepared in a factory is given below. Find its standard deviation.

Diameter(cm)	21-24	25-28	29-32	33-36	37-40	41-44
Number of plates	15	18	20	16	8	7

- The time taken by 50 students to complete a 100 meter race is given below. Find its SD.

Time taken(sec)	8.5-9.5	9.5-10.5	10.5-11.5	11.5-12.5	12.5-13.5
Number of students	6	8	17	10	9

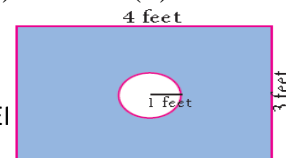
8. The diameter of circles (in mm) drawn in a design are given. Calculate the standard deviation.

Diameters	33-36	37-40	41-44	45-48	49-52
Number of circles	15	17	21	22	25

## TYPE 22

- A bag contains 5 blue balls and 4 green balls. A ball is drawn at random from the bag. Find the probability that the ball drawn is (i) blue (ii) not blue.
- Two dice are rolled. Find the probability that the sum of outcomes is (i) equal to 4 (ii) greater than 10 (iii) less than 13.
- From a well shuffled pack of 52 cards, one card is drawn at random. Find the probability of getting (i) red card (ii) heart card (iii) red king (iv) face card (v) number card.
- A bag contains 6 green balls, some black and red balls. Number of black balls is as twice as the number of red balls. Probability of getting a green ball is thrice the probability of getting a red ball. Find (i) number of black balls (ii) total number of balls.
- A game of chance consists of spinning an arrow which is equally likely to come to rest pointing to one of the numbers 1,2,3,...,12. What is the probability that it will point to (i) 7 (ii) a prime number (iii) a composite number?
- At a fete, cards bearing numbers 1 to 1000, one number on one card are put in a box. Each player selects one card at random and that card is not replaced. If the selected card has a perfect square number greater than 500, the player wins a prize. What is the probability that (i) the first player wins a prize (ii) the second player wins a prize, if the first has won?
- A bag contains 12 blue balls and  $x$  red balls. If one ball is drawn at random (i) what is the probability that it will be a red ball? (ii) If 8 more red balls are put in the bag, and if the probability of drawing a red ball will be twice that of the probability in (i), then find  $x$ .
- Two unbiased dice are rolled once. Find the probability of getting (i) the doublet (equal numbers on both dice) (ii) the product as a prime number (iii) the sum as a prime number (iv) the sum as 1.
- Three fair coins are tossed together. Find the probability of getting (i) all heads (ii) at least one tail (iii) at most one head (iii) at most two tails.
- Two dice are numbered 1, 2, 3, 4, 5, 6 and 1, 1, 2, 2, 3, 3 respectively. They are rolled and the sum of the numbers on them is noted. Find the probability of getting each sum from 2 to 9 separately.
- A bag contains 5 red balls, 6 white balls, 7 green balls, 8 blackballs. One ball is drawn at random from the bag. Find the probability that the ball drawn is (i) white (ii) black or red (iii) not white (iv) neither white nor black.
- In a box there are 20 non-defective and some defective bulbs. If the probability that a bulb selected at random from the box found to be defective is  $\frac{3}{8}$  then, find the number of defective bulbs.
- The king and queen of diamonds, queen and jack of hearts, jack and king of spades are removed from a deck of 52 playing cards and then well shuffled. Now one card is drawn at random from the remaining cards. Determine the probability that the card is (i) a clavor (ii) a queen of red card (iii) a king of black card.

13. Some boys are playing a game, in which the stone thrown by them landing





in a circular region (given in the figure) is considered as win and landing other than the circular region is considered as loss. What is the probability to win the game?

- 14.** Two customers Priya and Amuthan are visiting a particular shop in the same week (Monday to Saturday). Each is equally likely to visit the shop on anyone day as on another day. What is the probability that both will visit the shop on (i) the same day (ii) different days (iii) consecutive days?
- 15.** In a game, the entry fee is Rs.150. The game consists of tossing a coin 3 times. Dhana bought a ticket for entry. If one or two heads show, she gets her entry fee back. If she throws 3 heads, she receives double the entry fees. Otherwise she will lose. Find the probability that she (i) gets double entry fee (ii) just gets her entry fee (iii) loses the entry fee.
- 16.** Two dice are rolled together. Find probability of getting a doublet or sum of faces as 4.
- 17.** If A and B are two events such that  $P(A) = \frac{1}{4}$ ,  $P(B) = \frac{1}{2}$  and  $P(A \text{ and } B) = \frac{1}{8}$ , find (i)  $P(A \text{ or } B)$  (ii)  $P(\text{not } A \text{ and not } B)$ .
- 18.** A card is drawn from a pack of 52 cards. Find the probability of getting a king or a heart or a red card.
- 19.** In a class of 50 students, 28 opted for NCC, 30 opted for NSS and 18 opted both NCC and NSS. One of the students is selected at a random. Find the probability that (i) The student opted for NCC but not NSS. (ii) The student opted for NSS but not NCC. (iii) The student opted for exactly one of them.
- 20.** A and B are two candidates seeking admission to IIT. The probability that A getting selected is 0.5 and the probability that both A and B getting selected is 0.3. Prove that the probability of B being selected is at most 0.8.
- 21.** The probability that at least one of A and B occur is 0.6. If A and B occur simultaneously with probability 0.2, then find  $P(\bar{A}) + P(\bar{B})$ .
- 22.** The probability of happening of an event A is 0.5 and that of B is 0.3. If A and B are mutually exclusive events, then find the probability that neither A nor B happen.
- 23.** Two dice are rolled once. Find the probability of getting an even number on the first die or total of face sum 8.
- 24.** From a well shuffled pack of 52 cards, a card is drawn at random. Find the probability of it being either a red king or a black queen.
- 25.** A box contains cards numbered 3, 5, 7, 9, ..., 35, 37. A card is drawn at random from the box. Find the probability that the drawn card have either multiples of 7 or a prime number.
- 26.** Three unbiased coins are tossed once. Find the probability of getting at most 2 tails or at least 2 heads.
- 27.** The probability that a person will get an electrification contract is  $\frac{3}{5}$  and the probability that he will not get plumbing contract is  $\frac{5}{8}$ . The probability of getting at least one contract is  $\frac{5}{7}$ . What is the probability that he will get both?
- 27.** In a town of 8000 people, 1300 are over 50 years and 3000 are female. It is known that 30% of the female are over 50 years. What is the probability that a chosen individual from the town is either a female or over 50 years?
- 28.** A coin is tossed thrice. Find the probability of getting exactly two heads or atleast one tail or consecutive two heads.

**29.** If A, B, C are any three events such that probability of B is twice as that of probability of A and probability of C is thrice as that of probability of A and if  $P(A \cap B) = \frac{1}{6}$ ,  $P(B \cap C) = \frac{1}{4}$ ,  $P(A \cap C) = \frac{1}{8}$ ,  $P(A \cup B \cup C) = \frac{9}{10}$ ,  $P(A \cap B \cap C) = \frac{1}{15}$ , then find P(A), P(B) and P(C)?

**30.** In a class of 35, students are numbered from 1 to 35. The ratio of boys to girls is 4:3. The roll numbers of students begin with boys and end with girls. Find the probability that a student selected is either a boy with prime roll number or a girl with composite roll number or an even roll number.

GOVT HIGH SCHOOL ULIPURAM