



महाराष्ट्र शासन

शालेय शिक्षण व क्रीडा विभाग

राज्य शैक्षणिक संशोधन व प्रशिक्षण परिषद, महाराष्ट्र

७०८ सदाशिव पेठ, कुमठेकर मार्ग, पुणे ४११०३०

संपर्क क्रमांक (०२०) २४४७ ६९३८

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Question Bank

Standard :- 10<sup>th</sup>

Subject :- Mathematics Part 1

सूचना

१. फक्त विद्यार्थ्यांना प्रश्नप्रकारांचा सराव करून देण्यासाठीच
२. सदर प्रश्नसंचातील प्रश्न बोर्डाच्या प्रश्नपत्रिकेत येतीलच असे नाही याची नोंद घ्यावी.



9) The solution of the equation  $x-y=10$  and  $x+y=70$  is -----.

- A) (40,30)                      B) (30,40)                      C) (10,60)                      D) (50,20)

10) Find the value of  $D_x$  for the equation  $4x + 3y = 19$  and  $4x - 3y = -11$

- A) 24                              B) 0                              C) -24                              D) 108

**Q. 1 B) Each of 1 mark**

- 1) State with reason whether the equation  $3x^2 - 7y = 13$  is a linear equation with two variables?
- 2) Show the condition using variable  $x$  and  $y$ : Two numbers differ by 3
- 3) For the equation  $4x + 5y = 20$  find  $y$  when  $x = 0$
- 4) Write any two solutions of the equation  $x + y = 7$ .
- 5) Decide whether  $(0, 2)$  is the solution of the equation  $5x + 3y = 6$
- 6) Write any two solution of the equation  $a - b = -3$
- 7) If  $x+2y=5$  and  $2x+y=7$  then find the value of  $x+y$
- 8) If  $D_x = 24$  and  $x = -3$  then find the value of  $D$ .
- 9) The cost of the book is 5 rupees more than twice the cost of a pen. Show this using linear equation by taking Cost of book( $x$ ) and cost of a pen( $y$ ).
- 10) If  $\frac{a}{4} + \frac{b}{3} = 4$ , write the equation in standard form.

**Q.2 A) Complete the activity (2 marks)**

1) Complete the table to draw the graph of  $2x - 3y = 3$ ,

X	-6	<input type="text"/>
y	<input type="text"/>	1
(x, y)	<input type="text"/>	<input type="text"/>

2. Solve the following to find the value of following determinant.

$$\begin{vmatrix} 3 & -2 \\ 4 & 5 \end{vmatrix} = 3 \times \square - \square \times 4 = \square + 8 = \square$$

3) Complete the activity to find the value of  $x$

$$3x + 2y = 11 \quad \text{----- (I) and } 2x + 3y = 4 \quad \text{----- (II)}$$

Solution: Multiply equation (I) by ----- and equation (II) by -----.

$$\square \times (3x + 2y = 11) \quad \therefore 9x + 6y = 33$$

$$\square \times (2x + 3y = 4) \quad \therefore 4x + 6y = 8$$

subtract (II) from (I),

$$\square x = 25$$

$$\therefore x = \square$$

4) If (2, 0) is the solution of  $2x + 3y = k$  then find the value of  $k$  by completing the activity

Solution: (2,0) is solution of the equation  $2x + 3y = k$

Putting  $x = \square$  and  $y = \square$

$$\therefore 2(\square) + 3 \times 0 = k$$

$$\therefore 4 + 0 = k$$

$$\therefore k = \square$$

5) To find the values of x and y for the equations  $x - 2y = 5$  and  $2x + 3y = 10$  complete the activity.

$$D = \begin{vmatrix} 1 & -2 \\ 2 & 3 \end{vmatrix} = 3 + 4 = 7$$

$$D_x = \begin{vmatrix} 5 & -2 \\ 10 & 3 \end{vmatrix} = \square$$

$$D_y = \begin{vmatrix} 1 & 5 \\ 2 & 10 \end{vmatrix} = \square$$

By Cramer's rule

$$x = \frac{D_x}{D} = \square, y = \frac{D_y}{D} = \square$$

### Q. 2 B) Each of 2 marks

1) The difference between an angle and its complement is  $10^\circ$  find measure of larger angle.

2) Find the value of  $\begin{vmatrix} 5 & 2 \\ 0 & -1 \end{vmatrix}$

3) For the equation  $y + 2x = 19$  and  $2x - 3y = -3$  Find the value of D

4) In the equation  $2x - y = 2$  if  $x = 3$  then find  $y = ?$

5) If  $(2, -5)$  is the solution of the equation  $2x - ky = 14$  then find  $k = ?$

6) For the equation  $a + 2b = 7$  find a when  $b = 4$

7) Decide whether  $x = 2$  and  $y = -1$  is the solution of the equation  $2x + y = 3$  or not?

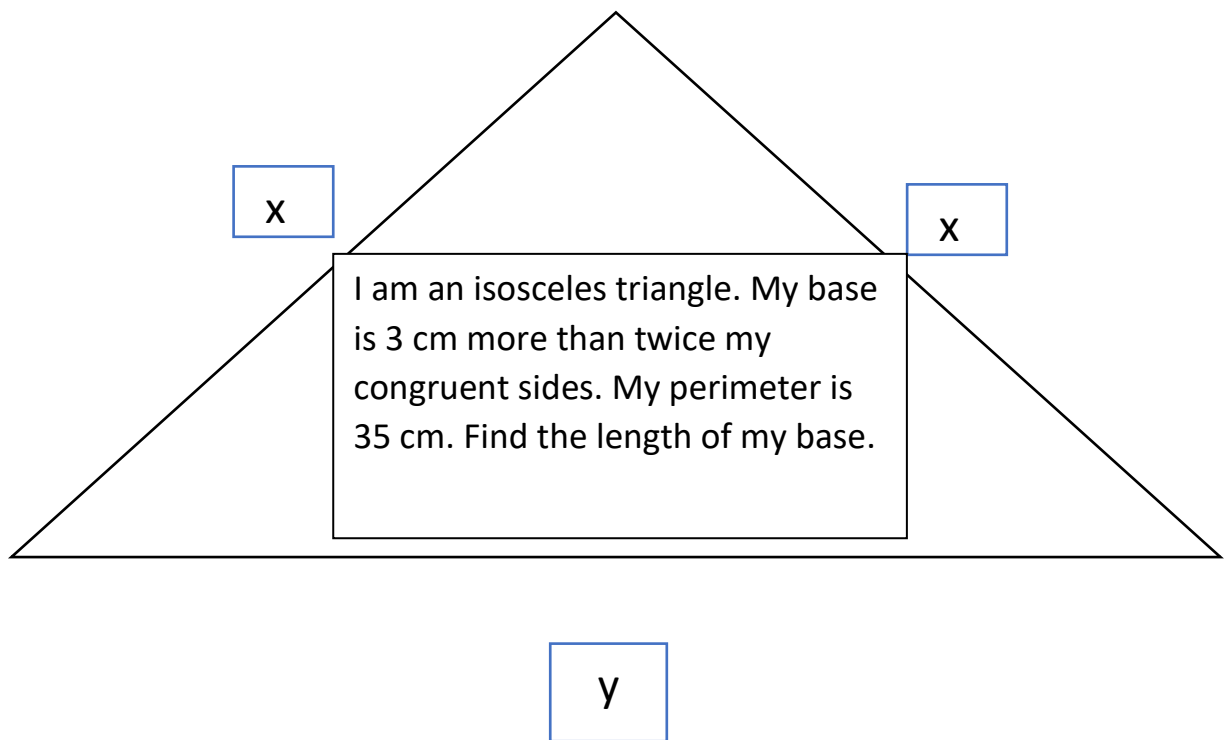
8) Using variables  $a$  and  $b$  write any two equations whose solution is  $(0, 2)$

9. If  $52x + 65y = 183$  and  $65x + 52y = 168$  then find  $x + y = ?$

10. State with reason whether the point  $(3, -2)$  will lie on the graph of the equation  $5m - 3n = -21$ .

**Q.3 A) Complete the activity.**

1)



2) Complete the following table to draw the graph of  $3x - 2y = 18$

X	0	4	2	-1
Y	-9	-----	-----	-----
x, y	$(0, -9)$	$(--, --)$	$(--, --)$	-----

3) The sum of the two-digit number and the number obtained by interchanging the digits is 132. The digit in the ten's place is 2 more than the digit in the unit's place. Complete the activity to find the original number.

Activity: Let the digit in the unit's place is  $y$  and the digit in the ten's place is  $x$ .

$$\therefore \text{The number} = 10x + y$$

$$\therefore \text{The number obtained by interchanging the digits} = \square$$

$$\therefore \text{The sum of the number and the number obtained by interchanging the digits} = 132$$

$$\therefore 10x + y + 10y + x = \square$$

$$\therefore x + y = \square \quad (I)$$

, By second condition,

$$\text{Digit in the ten's place} = \text{digit in the unit's place} + 2$$

$$\therefore x - y = 2 \quad \dots (II)$$

Solving equation (I) and (II)

$$\therefore x = \square \quad y = \square$$

$$\text{Ans: The original number} = \square$$

**Q.3 B) Each of 3 marks**

1) Solve the given simultaneous equations graphically  $x + y = 5$  and  $y = 5$ ,

2) Ajay is younger than Vijay by 3 years. The sum of their ages is 25 years, what is the age of Ajay.

3) Solve by Cramer's rule,  $3x - 4y = 10$ ;  $4x + 3y = 5$

4) Difference between two numbers is 3, the sum of three times the bigger number and two times the smaller number is 19. Then find the numbers.

5) Solve:  $4m - 2n = -4$ ;  $4m + 3n = 16$

6) Solve:  $99x + 101y = 499$ ;  $101x + 99y = 501$

7) The length of the rectangle is 5 more than twice its breadth. The perimeter of a rectangle is 52 cm then find the length of the rectangle.

8) The graph of the equations  $2x - y - 4 = 0$  and  $x + y + 1 = 0$  intersect each other in point P (a, b) then find the coordinates of P?

9) The solution of the equation  $ax + by + 5 = 0$  and  $bx - ay - 12 = 0$  is (2, -3)

Find the values of a and b.

10) A person starts a job with some fixed salary and yearly increment. After 4 years his salary is Rs.15000 and after 10 years it becomes Rs. 18000. Then find his monthly salary and increment.

11). For the equation  $3x - 2y = 17$  find the value of x when  $y = -1$  and find the value of y when  $x = 3$ .



#### Q.4 Solve (Each of 4 marks)

1) Solve the following equations by graphical method,  $x - y = 1$ ;  $2x + y = 8$

2) Using the determinants given below form two linear equations and solve them.

$$D = \begin{vmatrix} 5 & 7 \\ 2 & -3 \end{vmatrix} \quad D_y = \begin{vmatrix} 5 & 4 \\ 2 & -10 \end{vmatrix}$$

3) For an A.P,  $t_{17} = 54$  and  $t_9 = 30$  find the first term(a) and common difference(d).

4) A train covered a certain distance at a uniform speed. If the train would have been 6 km/h faster, it would have taken 4 hours less than the scheduled time. And ,if the train was slower by 6 km/h it would have taken 6 hours more than the scheduled time. Find the length of the journey.

5) Solve,  $0.4x + 0.3y = 1.7$ ;  $0.7x - 0.2y = 0.8$

6) The semi perimeter of a rectangular shape garden is 36 m. The length of the garden is 4 m more than its breadth. Find the length and the breadth of the garden.

#### Q. 5 Solve (Each of 3 marks)

1) Form the simultaneous linear equation using the determinants.

$$D = \begin{vmatrix} 4 & -3 \\ 2 & 5 \end{vmatrix} \quad D_x = \begin{vmatrix} 5 & -3 \\ 9 & 5 \end{vmatrix} \quad D_y = \begin{vmatrix} 4 & 5 \\ 2 & 9 \end{vmatrix}$$

2) I held a number 75 in my mind.

Write any condition showing the relation between their digits.

Write the condition showing relation between the number and the number obtained by interchanging the digits.

3) Write any two linear equations in two variables in which the value of one variable is 12 and the other 10.

4) From the railway station I took a rickshaw to go home. It is decided that I have to pay Rs.  $X$  for the first kilometre and for each kilometre Rs.  $Y$  for the next. For 10 kilometres the fare is Rs. 40 and for 16 kilometres fare is Rs. 58. Find the fare for the first kilometre.

## 2. Quadratic Equations

### Q 1 A) Multiple choice questions (for 1 mark each) :

Choose the correct alternative answer for each of the following sub questions and write the correct alphabet.

- 1) Which of the following is a quadratic equation?  
A)  $X^3+5X^2+X+3=0$    B)  $4X^2-3X-5=0$    C)  $X+5=0$    D)  $4X^5 = 0$
- 2) Which of the following is not a quadratic equation?  
A)  $2X^2-X+3=0$    B)  $4X^2-3X=0$    C)  $X^3-5X +3 =0$    D)  $4X^2 = 0$
- 3) If the root of the given quadratic equation are real and equal then find the value of 'k'  $X^2 + 2X + k = 0$  .  
A) 1      B) -1      C) 2      D) -2
- 4) What is the value of discriminant for the quadratic equation  $X^2 - 2X - 3 = 0$ ?  
A) -16    B) 16      C) 8      D) 4
- 5) Which of the following quadratic equation has roots -3 and -5 ?  
A)  $X^2-8X+15=0$    B)  $X^2-8X-15=0$    C)  $X^2+8X+15=0$    D)  $X^2+8X-15=0$
- 6) If one of the roots of quadratic equation  $X^2 - kX + 27 = 0$  is 3 then find the value of 'k'.  
A) 10                  B) 12                  C) -12                  D) 16
- 7) Degree of quadratic equation is always -----.  
A) 1                    B) 2                    C) 3                    D) 4

**Q 1 B) Examples for 1 mark :**

- 1) Write the given quadratic equation in standard form and also write the values of a, b and c .

$$4y^2 - 3y = -7$$

- 2) Write the roots of following quadratic equation.

$$(p - 5) (p + 3) = 0$$

- 3) If  $a = 1$ ,  $b = 4$ ,  $c = -5$  then find the value of  $b^2 - 4ac$ .
- 4) If  $b^2 - 4ac > 0$  and  $b^2 - 4ac < 0$  then write the nature of roots of the quadratic equation for each given case.
- 5) Write the given quadratic equation in standard form.

$$m(m - 6) = 9$$

**Q 2 A) Activity based questions for 2 marks each:**

- 1) Complete the following activity to solve the given quadratic equation by factorization method.

Activity:  $X^2 + 8x - 20 = 0$

$$X^2 + (\dots) - 2x - 20 = 0$$

$$X(x+10) - (\dots)(x+10) = 0$$

$$(x + 10) (\dots) = 0$$

$$X = \dots \text{ or } x = 2$$

- 2) Complete the following activity to find the value of discriminant for quadratic equation  $4x^2 - 5x + 3 = 0$ .

Activity:  $4x^2 - 5x + 3 = 0$

$$a = 4, b = \dots, c = 3$$

$$b^2 - 4ac = (-5)^2 - (\dots) \times 4 \times 3$$

$$= (\dots) - 48$$

$$b^2 - 4ac = \dots$$

- 3) If one of the root of quadratic equation  $X^2 + kx + 54 = 0$  is  $-6$  then complete the following activity to find the value of 'k'.

Activity: one of the roots of the quadratic equation  $X^2 + kx + 54 = 0$  is  $-6$

$$\begin{aligned} \text{Therefore let's take } x &= \dots \\ (-6)^2 + k(-6) + 54 &= 0 \\ (\dots) - 6k + 54 &= 0 \\ -6k + \dots &= 0 \\ k &= \dots \end{aligned}$$

- 4) To decide whether 1 is a root of quadratic equation  $X^2 + 4x - 5 = 0$  or not complete the following activity.

Activity: when  $x = (\dots)$

$$\begin{aligned} \text{L.H.S.} \\ &= 1^2 + 4(\dots) - 5 \\ &= 1 + 4 - 5 \\ &= (\dots) - 5 \\ &= \dots \\ &= \text{R.H.S.} \end{aligned}$$

Therefore  $x = 1$  is a root of quadratic equation  $X^2 + 4x - 5 = 0$ .

### Q 2 B) Examples for 2marks each:

- 1) Solve the following quadratic equation by factorization method.

$$3p^2 + 8p + 5 = 0$$

- 2) If one of the roots of quadratic equation  $X^2 - kx - 15 = 0$  is  $-3$  then find the value of 'k'.

- 3) If the Roots of a quadratic equation are 4 and  $-5$  then form the quadratic equation.

- 4) If roots of a quadratic equation  $3y^2 + ky + 12 = 0$  are real and equal then find the value of 'k'.
- 5) Roots of a quadratic equation are 5 and -4 then form the quadratic equation.

**Q 3 A) Examples for 3 marks each:**

- 1) Complete the following activity to solve the given quadratic equation by formula method.

$$2x^2 + 13x + 15 = 0$$

Activity :  $2x^2 + 13x + 15 = 0$

$$a = (\dots), b = 13, c = 15$$

$$b^2 - 4ac = (13)^2 - 4 \times 2 \times (\dots)$$

$$= 169 - 120$$

$$b^2 - 4ac = 49$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{-(\dots) \pm \sqrt{49}}{4}$$

$$x = \frac{-13 \pm (\dots)}{4}$$

$$x = \frac{6}{4} \quad \text{or} \quad x = \frac{-20}{4}$$

$$X = (\dots) \quad \text{or} \quad x = (\dots)$$

- 2) Complete the following activity to solve the given word problem.  
Sum of squares of two consecutive even natural numbers is 244 then find those numbers.

Activity: let the first even natural number be X,

Therefore its consecutive even natural number will be = (.....)

By the given condition,

$$X^2 + (x+2)^2 = 244$$

$$X^2 + X^2 + 4x + 4 - (\dots) = 0$$

$$2x^2 + 4x - 240 = 0$$

$$X^2 + 2x - 120 = 0$$

$$X^2 + (\dots) - (\dots) - 120 = 0$$

$$X(x+12) - (\dots)(x+12) = 0$$

$$(x+12)(x-10) = 0$$

$$X = (\dots) / X = 10$$

But natural number cannot be negative  $x = -12$  is not possible.

Therefore first even natural number is  $x = 10$ .

Second even consecutive natural number =  $x+2 = 10+2 = 12$ .

### Q 3 B) Examples for 3 marks each:

- 1) If the roots of the given quadratic equations are real and equal then find the value of 'k'.

$$kx(x-2) + 6 = 0$$

- 2) Mukund has Rs. 50 more than Sagar. If the product of the amount they have is 15,000 then find the amount each has.

- 3) Solve the following quadratic equation.

$$\sqrt{3}x^2 + \sqrt{2}x - 2\sqrt{3} = 0$$

- 3) Solve the following quadratic equations by formula method.

- a)  $5m^2 - 4m - 2 = 0$

b)  $Y^2 + \frac{1}{3}y = 2$

- 4) Form a quadratic equation if the roots of the quadratic equation are  $2 + \sqrt{7}$  and  $2 - \sqrt{7}$  .

**Q 4) Examples for 4 marks each :**

- 1) Present age of mother of Manish is 1 year more than 5 times the present age of Manish. Four years before If the product of their ages was 22 then find the present age of Manish and his mother.
- 2) In an orchard there are total 200 trees. If the number of trees in each column is more by 10 than the number of trees in each row then find the number of trees in each row.
- 3) If the roots of the given quadratic equation are real and equal then find the value of 'm'.

$$(m-12) x^2 + 2 (m-12) x + 2 = 0$$

- 4) Solve the following quadratic equation.

$$\frac{1}{4-p} - \frac{1}{2+p} = \frac{1}{4}$$



5) Sum of the roots of the quadratic equation is 5 and sum of their cubes is 35 then find the quadratic equation.

**Q 5) Examples of 3 marks each:**

- 1) **Form a quadratic equation such that one of its roots is 5. Form a quadratic equation for it and write. ( For the formation of word problem you can use quantities like age, rupees or natural numbers.) (sample solution for the above example is given below students can take another number to form another example)**

Solution: We need one of the solutions of quadratic equation as 5. Then we can take another root as any number like positive or negative number or zero. Here I am taking another root of quadratic equation as 2.

Then we can form a word problem as below,

Smita is younger than her sister Mita by 3 years ( $5-2=3$ ). If the product of their ages is ( $5 \times 2 = 10$ ). Then find their present ages. (to form a word problem 1 mark)

Let the age of Mita be  $x$ ,

Therefore age of Smita =  $x-3$  (1 mark for this)

By the given condition,

$$X(x-3) = 10$$

$$X^2 - 3x - 10 = 0 \text{ (to form a quadratic equation 1 mark)}$$

### 3.Arithmetic Progression

- Question for 1 Mark.

A)Choose the correct alternative answer for each of the following sub questions.

1. In an Arithmetic Progression 2,4,6,8,.....the common difference d is.....  
(A) 8                    (B) 6                    (C) 2                    (D) -2
2. What is the common difference of the sequence 0,-4,-8,-12 ?  
(A) 4                    (B) -4                    (C) 8                    (D) -8
3. For an A.P. 5,12,19,26,..... a=?  
(A) 12                    (B) 26                    (C) 19                    (D) 5
4. A set of numbers where the numbers are arranged in a definite order, like the natural numbers, is called a .....  
(A) index (B) numbers                    (C) line                    (D) sequence
5. First four terms of an A.P., are.....whose first term is -2 and common difference is -2.  
(A)-2,0,2,4    (B)-2,4,-8,16    (C)-2,-4,-6,-8    (D)-2,-4,-8,-16
6. 1,4,7,10,13..... Next two terms of this A.P. are.....  
(A) 16,19    (B) 10,7    (C) 19,22    (D) 16,18
7. Find d of an A.P. whose first two terms are -3 and -4.  
(A) 7                    (B) 4                    (C) -7                    (D) -3
8. If third term and fifth term of an A.P. are 13 and 25 respectively, find its 7<sup>th</sup> term.  
(A) 30                    (B) 33                    (C) 37                    (D) 38
9. Find  $t_3 = ?$  in an A.P. 9,15,21,27  
(A) 27                    (B) 21                    (C) 15                    (D) 9

10. In an A.P., 0,-4,-8,-12.....find  $t_2 = ?$   
 (A) -8                      (B) -4                      (C) -12                      (D) 0

**B) Solve the following sub questions.**

1. Decide whether the given sequence 2,4,6,8.....is an A.P.
2. Find a and d for an A.P., 1,4,7,10.....
3. Write the formula of the sum of first n terms for an A.P.
4. Find  $t_n$  if  $a=20$  आणि  $d=3$
5. Find  $t_5$  if  $a=3$  आणि  $d=-3$
6.  $t_n = 2n-5$  in a sequence, find its first two terms.
7. Find first term of the sequence  $t_n=2n+1$
8. Find two terms of the sequence  $t_n=3n-2$
9. Find common difference of an A.P.,0.9,0.6,0.3.....
10. Find d if  $t_9=23$  व  $a=7$ .

• **Question for 2 Marks.**

**A) complete the following activity**

- 1) Find the sum of first 1000 positive integers.

Activity :- Let  $1+2+3+\dots+1000$

Using formula for the sum of first n terms of an A.P.,

$$S_n = \boxed{\phantom{000}}$$

$$S_{1000} = \frac{\boxed{\phantom{000}}}{2} (1+1000)$$

$$= 500 \times 1001$$

$$= \boxed{\phantom{000}}$$

Therefore, Sum of the first 1000 positive integer is  $\boxed{\phantom{000}}$

- 2) Which term of following A.P. is -940.

50,40,30,20.....

Activity:- Here  $a = \square$   $d = \square$   $t_n = -940$

According to formula,  $t_n = a + (n-1)d$

$$-940 = \square$$

$$n = \square$$

3) For an A.P., If  $t_1 = 1$  and  $t_n = 149$  then find  $S_n$ .

Activity :- Here  $t_1 = 1$ ,  $t_n = 149$ ,  $S_n = ?$

$$S_n = \frac{n}{2} (\square + \square)$$

$$= \frac{n}{2} \times \square$$

$$= \square n$$

4)  $t_{19} = ?$  for the given A.P., 9,4,-1,-6.....

Activity :- Here  $a = 9$ ,  $d = \square$

$$t_n = a + (n-1)d$$

$$t_{19} = 9 + (19-1)\square$$

$$= 9 + \square$$

$$= \square$$

5) Common difference,  $d = ?$  for the given A.P., 7,14,21,28.....

Activity :- Here  $t_1 = 7$ ,  $t_2 = 14$ ,  $t_3 = 21$ ,  $t_4 = \square$

$$t_2 - t_1 = \square$$

$$t_3 - t_2 = 7$$

$$t_4 - t_3 = \square$$

Therefore, common difference  $d = \square$

**B) Solve the following.**

1. Decide whether the following sequence is an A.P. or not.

3,5,7,9,11.....

2. Find first four terms of an A.P., whose first term is 3 and common difference is 4.
3. 1,6,11,16.....Find the 18<sup>th</sup> term of this A.P.
4. In an A.P.  $a=2$  and  $d=3$ , then find  $S_{12}$ .
5. Find first four terms of the sequence  $t_n=n+2$ .
6. In an A.P.,  $a=10$  and  $d= -3$  then find its first four terms.
7. 1,7,13,19.....find 18<sup>th</sup> term of this A.P.
8. In an A.P.  $a=4$  and  $d=0$ , then find first five terms.
9. If  $a=6$  and  $d=10$ , then find  $S_{10}$ .
10. Decide whether the given sequence 24,17,10,3.....is an A.P.? If yes find its common term ( $t_n$ ) .

- **Question for 3 Marks**

**A) complete the following activity**

- 1) how many two-digit numbers are divisible by 5?

Activity :- Two-digit numbers divisible by 5 are, 10,15,20.....95.

Here,  $d=5$ , therefore this sequence is an A.P.

Here  $a=10$ ,  $d=5$ ,  $T_n=95$ ,  $n=?$

$$t_n = a+(n-1 \square )$$

$$\square = 10+(n-1)\times 5$$

$$\square = (n-1)\times 5$$

$$\square = (n-1)$$

therefore  $n=\square$

there are  $\square$  two-digit numbers divisible by 5.

2) Kalpana saves some amount every month. In first three months she saves Rs.100, Rs.150 and Rs.200 respectively. In how many months will she save Rs.1200?

Activity :- Kalpana's monthly saving is Rs.100, Rs.150, Rs.200.....Rs.1200

Here  $d=50$ . Therefore this sequence is an A.P.

$$a=100, \quad d=50, \quad t_n = \square \quad n=?$$

$$t_n = a + (n-1) \square$$

$$\square = 100 + (n-1) \times 50$$

$$\frac{\square}{50} = n-1$$

$$n = \square$$

therefore, she saves Rs.1200 in  $\square$  months.

3) Determine the sum of first 100 terms of given A.P. 12, 14, 16, 18, 20.....

Activity :- here,  $a=12$ ,  $\square$   $n=100$ ,  $S_{100}=?$

$$S_n = \frac{n}{2} [ \square (n-1) d ]$$

$$S_{100} = \frac{\square}{2} [ 24 + (100-1) d ]$$

$$= 50 ( 24 + \square )$$

$$= \square$$

$$= \square$$

4) Find the sum of natural numbers between 1 to 140, which are divisible by 4.

Activity :- Natural numbers between 1 to 140 divisible by 4 are,

4, 8, 12, 16, ..... 136

Here  $d=4$ , therefore this sequence is an A.P.

$$a=4, \quad d=4, \quad t_n=136, \quad S_n=?$$

$$t_n = a+(n-1)d$$

$$\square = 4+(n-1)\times 4$$

$$\square = (n-1)\times 4$$

$$n = \square$$

Now,

$$S_n = \frac{n}{2} [a + t_n]$$

$$S_n = 17 \times \square$$

$$S_n = \square$$

Therefore, the sum of natural numbers between 1 to 140, which are divisible by 4 is  $\square$

5) Decide whether 301 is term of given sequence 5,11,17,23,.....

Activity :- Here,  $d = \square$  therefore this sequence is an A.P.

$$a = 5, d = \square$$

Let nth term of this A.P. be 301.

$$t_n = a+(n-1)\square$$

$$301 = 5+(n-1)\times 6$$

$$301 = 6n-1$$

$$n = \frac{302}{6} = \square$$

But n is not positive integer

Therefore, 301 is  $\square$  the term of sequence 5,11,17,23,.....

**B)Solve the following sub questions.**

1. Find  $S_{10}$  if  $a=6$  and  $d=3$
2. 12,16,20,24,.....Find 25<sup>th</sup> term of this A.P.
3. If  $t_n=2n-5$  is the nth term of an A.P., then find its first five terms.

4. Find the sum of three-digit natural numbers, which are divisible by 4.
5. Merry got a job with salary Rs.15000 per month. If her salary increases by Rs.100 per month, how much would be her salary after 20 months?
6. The  $n^{\text{th}}$  term of an A.P 5,8,11,14..... is 68. Find  $n$ =?
7. What is the sum of an odd numbers between 1 to 50.
8. For an A.P.,  $t_4=12$  and its common difference  $d=-10$ , then find  $t_n$ .
9. Find 27th and  $n^{\text{th}}$  term of given A.P. 5,2,-1,-4.....
10. Find the first terms and common difference of an A.P. whose  $t_8=3$  and  $t_{12}=52$ .

- **Question for 4 marks**

**Solve the following sub questions.**

1. Sum of first 55 terms of an A.P. is 3300. Then find its 28<sup>th</sup> term.
2. Find the sum of numbers between 1 to 140, divisible by 4.
3. In a 'Mahila Bachat Gat', Sharvari invested Rs.2 on first day, Rs.4 on second day and Rs.6 on third day. If She saves like this, then what would be her total savings in the month of February 2010?
4. Find the sum of odd natural numbers from 1 to 101.
5. Shubhankar invested in a national savings certificate scheme. In the first year he invested Rs.500, in the second year Rs.700, in the third year Rs.900 and so on. Find the total amount that he invested in 12 years.
6. A merchant borrows Rs.1000 and agrees to repay its interest Rs.140 with principal in 12 monthly instalments. Each instalment being less than the preceding one by Rs.10. Find the amount of the first first instalment.
7. Find  $t_{21}$ , if  $S_{41} = 4510$  in an A.P.
8. In an A.P.  $t_{10}=57$  and  $t_{15}=87$  then find  $t_{21}$ .



9. If Rs.3900 will have to repay In 12 monthly instalments such that each instalment being more than the preceding one by Rs.10, then find the amount of the first and last instalment.
10. Find the next 4 terms of the sequence  $\frac{1}{6}$  ,  $\frac{1}{4}$  ,  $\frac{1}{3}$  also find  $S_n$ .

## 4. Probability

**Q.1 (A) There are four alternative answers for each of the following sub-questions. Choose the correct alternative answer for each of the following questions and write the alphabet. (1 mark question)**

- 1) Which of the following number cannot represent a probability?  
A) 0.66      B) 1.5      C) 0.15      D) 0.7
- 2) If  $n(A) = 5$ ,  $P(A) = \frac{1}{2}$  then  $n(S) = ?$   
A) 10      B)  $\frac{3}{5}$       C)  $\frac{4}{5}$       D)  $\frac{1}{3}$
- 3) When a dice is thrown the number of sample points in the sample space are .....  
A) 4      B) 6      C) 2      D) 52
- 4) In how many ways a card can be drawn from a well shuffled pack of playing cards,  
A) 4      B) 1      C) 26      D) 52
- 5) What is the probability of the event that a number chosen from 1 to 50 is a prime number ?  
A)  $\frac{3}{10}$       B)  $\frac{1}{2}$       C)  $\frac{1}{4}$       D)  $\frac{3}{25}$
- 6) Which of the following options shows the highest probability.  
A)  $\frac{4}{5}$       B) 0.83      C) %58      D)  $\frac{1}{2}$
- 7) When two dice are thrown the number of sample points in the sample space are .....  
A) 6      B) 12      C) 36      D) 52

**Q.1 (B) Solve the following sub-questions. (1 mark question)**

- 1) Write a sample space if two coins are tossed simultaneously.
- 2) Write a sample space when a die is thrown.
- 3) In a set of 25 cards, each card bears only one number from 1 to 25. One card

is drawn randomly. Write the sample space for this random experiment?

4) A two digit number is formed with digits 2, 3, 5 without repetition, Write the sample space ?

5) write the event in the set form for the following random experiment.

‘ If one die is thrown, the number obtained on the upper face is even.’

**Q.2 (A) Complete the following activity. (2 marks question)**

1) If one die is rolled then find the probability of the following event by completing the activity.

Event A: Number on the upper face is prime.

**Activity :** Let ‘S’ is the sample space.

$$S = \{1, 2, 3, 4, 5, 6\} \therefore n(S) = 6$$

Event A : Prime number on the upper face.

$$A = \{ \dots\dots\dots \} \therefore n(A) = 3$$

$$P(A) = \frac{\square}{n(S)} \dots\dots\dots \text{(Formula)}$$

$$= \frac{\square}{6}$$

$$\therefore P(A) = \frac{1}{\square}$$

2) Two coins are tossed simultaneously. Write the sample space (S) and expected

sample points in the given events by completing the activity.

i) Event A : to get at least one head.

ii) Event B : to get no head.

**Activity :** Let ‘S’ is the sample space , when two coins are tossed simultaneously.

$$\therefore S = \{ \square, HT, TH, \square \}$$

Event A : to get at least one head.

$$\therefore A = \{ HH, \square, TH \}$$

Event B : to get no head.

$$\therefore B = \{ \square \}$$

3) A card is drawn from a well shuffled pack of 52 playing cards. Find the

probability of i) Event A : Card drawn is a red card.

**Activity** : Let 'S' is the sample space.  $\therefore n(S) = 52$

Event A : Card drawn is a red card.

$\therefore$  Total red cards = ( ) hearts + 13 diamonds

$\therefore n(A) = ( )$

$\therefore P(A) = \frac{\square}{n(S)}$  ..... Formula

$$P(A) = \frac{26}{52}$$

$$P(A) = \square$$

- 4) In Adarsh High School , out of 30 students in a class 3 students wear glasses(spectacles). If a student in the class is randomly selected, find the probability that he or she wears glasses(spectacles) by completing the following activity.

**Activity** : There are a total of 30 students in the class.

$\therefore n(S) = \square$

Event : A Selected student wears glasses(spectacles)

$\therefore n(A) = \square$

$P(A) = \frac{\square}{n(S)}$  .....Formula

$$P(A) = \square$$

**Q.2 (B) Solve the following sub-questions. (2 marks question)**

- 1) A card is drawn at random from a pack of well shuffled 52 playing cards. Find the probability that the card drawn is a spade.
- 2) If two coins are tossed, find the probability of event getting head on both the coins.
- 3) If one die is rolled then find the probability of event that the number on the upper face is greater than 6?
- 4) If three coins are tossed simultaneously, find the probability of the event to get no head
- 5) There are 30 cards in a box, each bearing one of the numbers from 1 to 30.

One card is drawn at random from the box. Find the probability of event that the card drawn shows a number which is a multiple of 5.

**Q.3 (A) Complete the following activity. (3 marks question)**

- 1) A box contains 5 strawberry chocolates, 6 coffee chocolates and 2 peppermint chocolates. If one of the chocolates is picked from the box at randomly, Find the probability of the following events by completing the activity.
  - (i) Event A : it is a coffee chocolate.
  - (ii) Event B : it is a peppermint chocolate.

**Activity :** Let 'S' is the sample space.

$$\therefore n(S) = 5+6+2 = 13$$

- (i) Event A : it is a coffee chocolate

$$\therefore n(A) = \square$$

$$\therefore P(A) = \frac{\square}{n(S)} \quad \dots\dots\dots \text{Formula}$$

$$P(A) = \frac{\square}{13}$$

- (ii) Event B : it is a peppermint chocolate.

$$\therefore n(B) = \square$$

$$\therefore P(B) = \frac{\square}{n(S)} \quad \dots\dots\dots \text{Formula}$$

$$P(B) = \frac{\square}{13}$$

**Q.3 (B) Solve the following sub-questions. (3 marks question)**

- 1) If two dice are rolled simultaneously, find the probability of the following events.
  - i) Event A : The sum of the digits on the upper faces is at least 10.
  - ii) Event B : The sum of the digits on the upper faces is 33.
  
- 2) If Three coins are tossed simultaneously, find the probability of the following events.
  - i) Event A : To get no heads.
  - ii) Event B : To get at least two heads.
  
- 3) If One coin and one die are thrown simultaneously, find the probability of the following events.

- i) Event A : To get a tail and an even number.
- ii) Event B: To get head and an odd number.

- 4) A balloon vendor has 2 red, 3 blue and 4 green balloons. He wants to choose one of them at random to give it to Pranali. What is the probability of the event that Pranali gets,
- (i) a red balloon
  - (ii) a blue balloon.

**Q.4 Solve the following sub-questions. (4 marks question)**

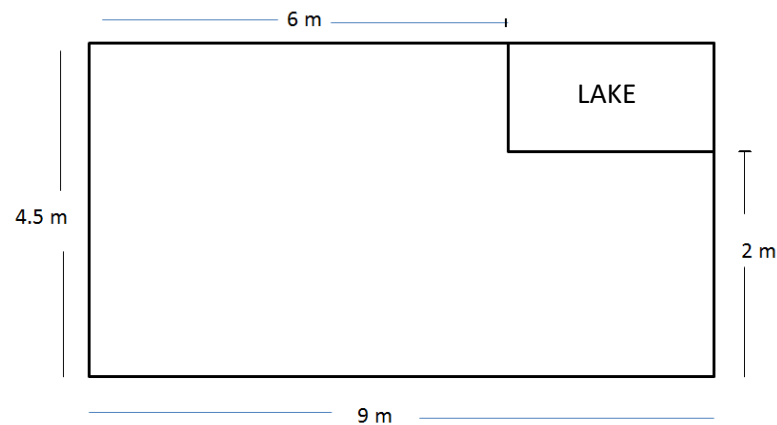
- 1) What is the probability that an ordinary year has 53 Sundays?
- 2) What is the probability that a leap year has 53 Sundays?
- 3) A box contains 36 cards, bearing only one number from 1 to 36 on each. If one card is drawn at random, find the probability of an event that the card drawn bears,
  - (i) a complete square number.
  - (ii) a prime number.
  - (iii) a number divisible by 3.

**Q.5 Creative questions of 3 marks**

- 1) A bag contains 5 white balls and some blue balls. If the probability of drawing a blue ball is double that of a white ball, determine the number of blue balls in the bag .
- 2) The faces of a die bear numbers 0, 1, 2, 3, 4, 5. If the die is rolled twice, then find the probability that the product of digits on the upper face is zero.

- 2) A missing helicopter is reported to have crashed somewhere in the rectangular region shown in the figure .

What is the probability that it crashed inside the lake shown in the figure ?



- 4) Three horses A ,B and C are in a race. A is twice as likely to win as B and B is twice as likely to win as C What is their individual probability of winning?
- 5) A bag contains 8 red balls and some blue balls. If one ball is drawn randomly the probability of drawing a red ball to a blue ball are in the ratio 5 : 2, determine the probability of drawing a blue ball from the bag.