



MATHEMATICS (IX)

Time: 3 Hours

Maximum Marks: 80

General Instructions:

- Section A consists of twenty questions (Q no. 1-20) of one mark each.
- Section B consists of five questions (Q no. 21- 25) of two marks each.
- Section C consists of six questions (Q no. 26 - 31) of three marks each.
- Section D consists of four questions (Q no. 32-35) of five marks
- Section E consists of three case study based questions (Q no. 36-38) of four marks each with subparts of the values 1, 1 and 2 marks each respectively.
- All questions are compulsory. However, an internal choice has been provided.

SECTION - A

- Signs of the abscissa and ordinate of a point in the fourth quadrant are respectively:
a. (+,+) b. (-,-) c. (-,+) ☒ d. (+,-)
- $p(x)=3\sqrt{7} + 2$ is a polynomial of degree:
a. 3 b. 1 ☒ c. 0 d. 2
- Between $\frac{2}{11}$ and $\frac{3}{11}$ how many rational numbers are there?
a. only one b. only two c. only three ☒ d. infinitely many
- The decimal expansion of $\sqrt{2}$ is:
☒ a. non-terminating non-recurring b. a finite decimal
c. 1.41421 d. non-terminating recurring
- The coefficient of x^2 in $(2x^2 - 5)(5 + 4x^2)$ is:
a. 12 ☒ b. -10 c. -14 d. 14
- An irrational number between 2 and 3.5 is:
a. 2 b. $\sqrt{7}$ ☒ c. $\sqrt{22.5}$ d. $\sqrt{15.5}$
- For $x = 3, y = 2, u = -9, v = 13$, the point $(x+y, u+v)$ lies in which quadrant?
a. IIIrd b. IIrd ☒ c. Ist d. IVth
- If $P(3, m-2) = Q(n-1, 5)$, find m and n .
a. $m = 7, n = -4$ ☒ b. $m = 7, n = 4$ c. $m = -7, n = 4$ d. $m = -7, n = -4$
- The mid-point of the line segment joining $(-6, 8)$ and $(4, -2)$ is:
a. $(-1, -3)$ ☒ b. $(-1, 3)$ c. $(-5, 3)$ d. $(1, -5)$
- The classification of polynomial $y^3 - 2y - 6$ on the basis of degree is:
☒ a. cubic b. quadratic c. binomial d. trinomial
- The value of the polynomial $(x-1)(x+1)$ at $x=1$ is:
a. 2 b. 1 ☒ c. 0 d. -1
- Point $(0, -7)$ lies:
☒ a. on the x-axis b. in the second quadrant ☒ c. on the y-axis d. in the fourth quadrant
- The point of intersection of the coordinate axes is:
a. ordinate b. abscissa c. quadrant ☒ d. origin
- The value of the polynomial $5x - 4x^2 + 3$ at $x=1$ is:
a. 0 b. 4 ☒ c. -1 d. 1
- Abscissa of all points on y-axis is:
☒ a. 0 b. 1 c. 2 d. -1
- If $A(2, -3)$ and $B(-3, 2)$ are two given points, then what is the value of (Abscissa of A) - (Abscissa of B)?
a. -6 b. 6 ☒ c. 5 d. 4
- If $a_n = (-1)^n(2n - 1)$, find a_{10} .
☒ a. 19 b. -19 c. 20 d. -20
- If 15, m, 21 are in A.P, then the value of m is:
☒ a. 16 b. 18 c. 13 d. 14
- Assertion: $2+\sqrt{6}$ is an irrational number.
Reason: Sum of a rational number and an irrational number is always irrational.
☒ a. Both Assertion(A) and reason(R) are correct and reason is the correct explanation for assertion.
b. Both Assertion(A) and reason(R) are correct and reason is not the correct explanation for assertion.
c. Assertion(A) is true but the reason(R) is false.
d. Assertions (A) is false but reason(R) is true.
- Assertion: The mid-point of the line segment joining the points $A(-2, 8)$ and $B(-6, -4)$ is $(-4, 2)$
Reason: If $A(x_1, y_1)$ and $B(x_2, y_2)$ are two given points, then mid-point of AB is $(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2})$

$$\begin{array}{r} 2 \overline{) 15.5} \\ \underline{-16} \\ 15 \\ \underline{-15} \\ 0 \end{array}$$
$$\begin{array}{r} 2 \overline{) 22.5} \\ \underline{-22} \\ 5 \\ \underline{-5} \\ 0 \end{array}$$

$$\frac{-6+8}{2}, \frac{8+(-2)}{2}$$

$$\frac{-4}{2}, \frac{6}{2}$$

$$-2 \quad 3$$

$$\begin{array}{r} 16 \\ -6 \\ \hline 10 \\ -3 \\ \hline 7 \end{array}$$

$$\begin{array}{r} 5-16 \\ = -11 \\ -11+3 \\ = -8 \end{array}$$

- a. Both Assertion(A) and reason(R) are correct and reason is the correct explanation for assertion
 b. Both Assertion(A) and reason(R) are correct and reason is not the correct explanation for assertion
 c. Assertion(A) is true but the reason(R) is false.
 d. Assertion (A) is false but reasons(R) is true.

SECTION - B

21. Find the value of 'm' so that $8m + 4$, $6m - 2$ and $2m + 7$ form an A.P.
 22. Find the distance between the given points $P(2, -3)$ and $B(-2, -4)$. *3 units*
 23. If $\frac{x}{3} + \frac{x}{5} = \frac{16}{15}$, find the rational number x.
 24. How many numbers of two digits are divisible by 4? (Show the working)
 25. Find the co-ordinates of a point:
 a) Whose ordinate is 2 and lies on y-axis. *(0, 2)*
 b) Whose abscissa is 3 and lies on x-axis. *(3, 0)*

Or

If $(k, 2)$ is the mid-point of the line joining $(-2, -3)$ and $(6, 7)$, find the value of k.

SECTION - C

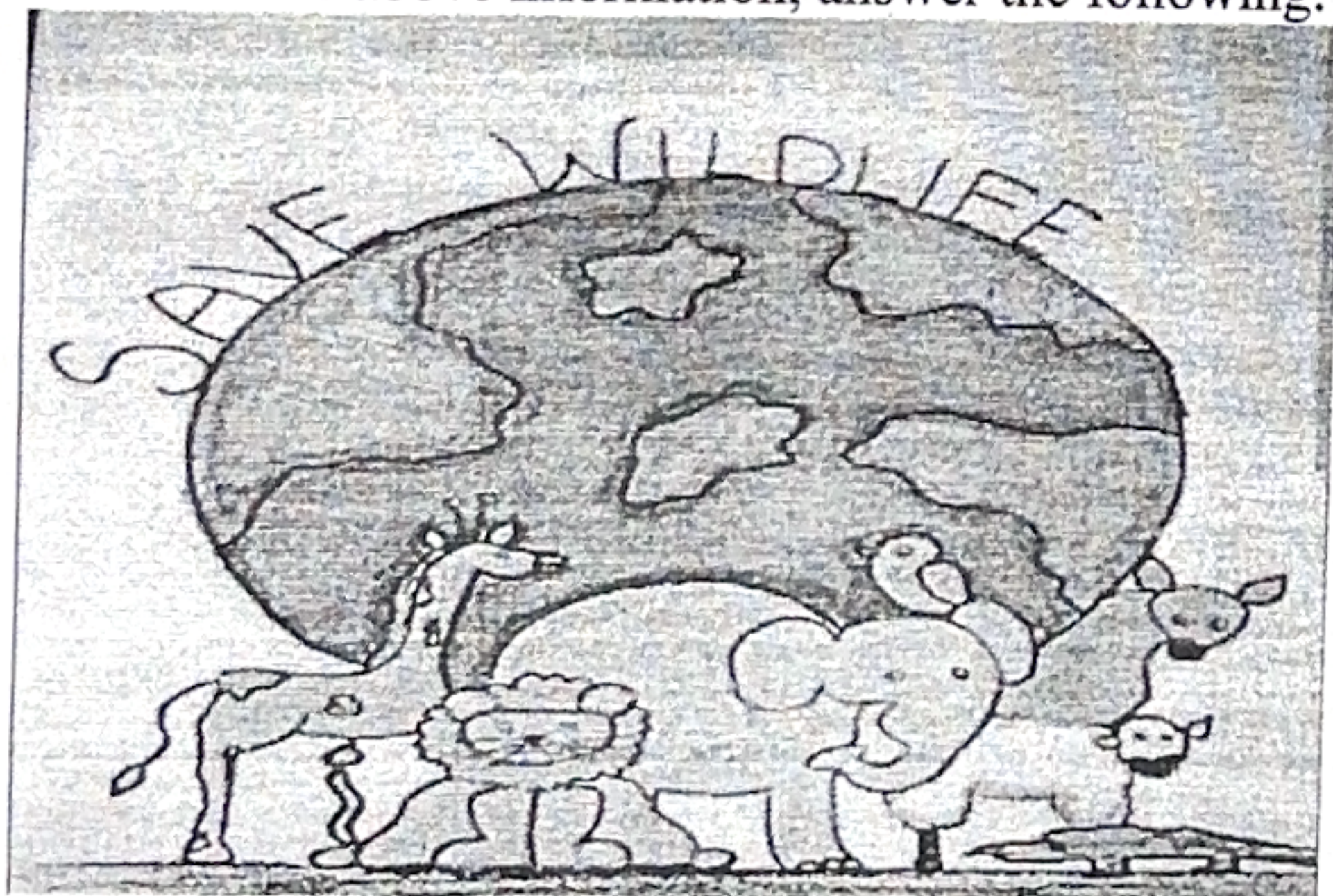
26. Prove that $\sqrt{3}$ is an irrational number.
 27. Show that the points $A(0, 9)$, $B(-4, -1)$ and $C(3, 2)$ are the vertices of a right angled Δ .
 28. Represent $\sqrt{5.4}$ on number line.
 29. In a G.P., the 3rd term is 8 and the 6th term is 64. Find the 9th term.
 Or
 Find the 31st term of an A.P whose 11th term is 38 and 16th term is 73.
 30. If the sum of n terms of two arithmetic series are in the ratio $7n + 1 : 4n + 27$, find the ratio of their 11th term.
 31. If we multiply a number by $\frac{5}{2}$ and add $\frac{2}{3}$ to the product, we get $\frac{-7}{12}$. Find the number. *x = -14*

SECTION - D

32. Draw the graphs for the lines $y=2x-1$, $y=2x$, $y=2x+1$. Also reflect the role of 'a' and 'b'.
 33. Show that the points $A(0, 5)$, $B(-2, -2)$, $C(5, 0)$ and $D(7, 7)$ are the vertices of a rhombus. Also, find its perimeter. *AB = \sqrt{5}*
 34. The initial population of a village is 750. Every year, 50 people move from a nearby city to the village.
 a. Find the population of the village after 6 years. *1050*
 b. Make a table of values for 't' varying from 0 to 10 years and show how the population, P, increases every year.
 c. Find an expression that relates P and t and explain why it represents linear growth. *P = 50t + 750*
 35. A learning platform charges a fixed monthly fee and an additional cost per digital learning module accessed. A student observes that when she accessed 10 modules, her bill was Rs.400. When she accessed 14 modules, her bill was Rs.500. If the monthly bill y depends on the number of modules accessed, x, according to the relation $y = ax + b$, find the values of a and b.
 Or
 Show that the points $A(1, 2)$, $B(5, 4)$, $C(3, 8)$ and $D(-1, 6)$ are the vertices of a square. Also, find its area. *a = 25, b = 25, 40*

SECTION - E

36. In a school, 5 out of every 7 children participated in 'SAVE WILDLIFE' campaign organized by the school authorities. Based on the above information, answer the following:



- a. What fraction of the students participated in the campaign? Find its decimal expansion.
 b. What kind of decimal expansion is this? (Found in a.)
 c. Find four rational numbers between $\frac{2}{5}$ and $\frac{2}{3}$.
 Or
 Find four irrational numbers between $\frac{2}{5}$ and $\frac{2}{3}$.

$$\frac{5}{7} = \frac{75}{105} = \frac{25}{35} = \frac{5}{7}$$

$$\frac{25}{35} = \frac{5}{7}$$

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

$$400 \sqrt{250}$$

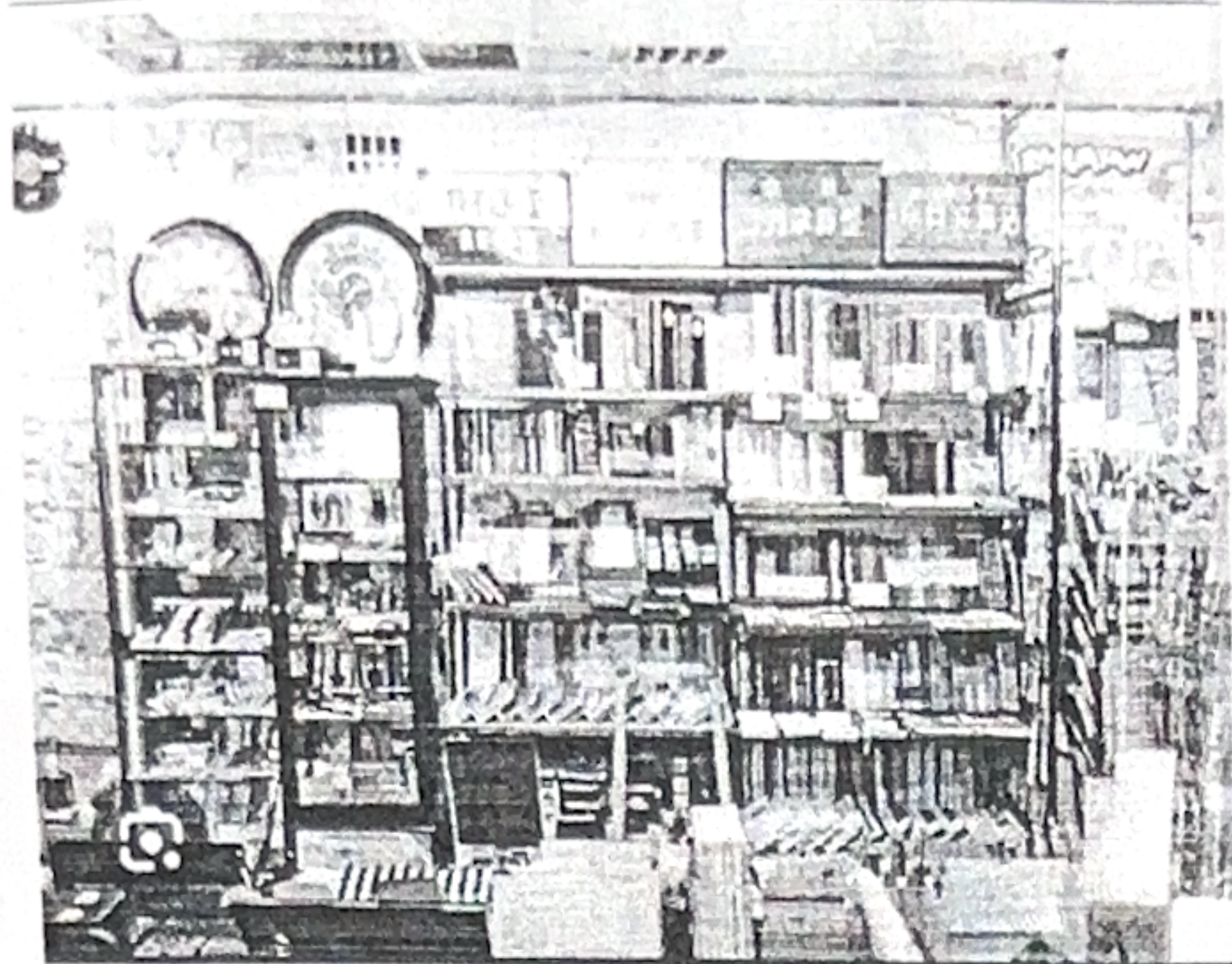
$$\frac{25}{4} = \frac{100}{16} = \frac{25}{4}$$

$$\frac{25}{4} = \frac{100}{16} = \frac{25}{4}$$

$$\frac{70}{150}, \frac{71}{150}, \frac{72}{150}, \frac{73}{150}$$

$$D = \sqrt{(y_2 - y_1)^2 + (x_2 - x_1)^2}$$

Ram bought 7 books and 2 pens for Rs. 90 and his friend Mohan bought the same 4 books and 3 pens for Rs. 50. On the basis of the above information, answer the following:



$$2x + y$$

$$\begin{aligned} 3(1) + 1 &= 4 \\ 3 + 1 &= 4 \end{aligned} \quad \begin{aligned} 3(2) + 1 &= 7 \\ 6 + 1 &= 7 \end{aligned}$$

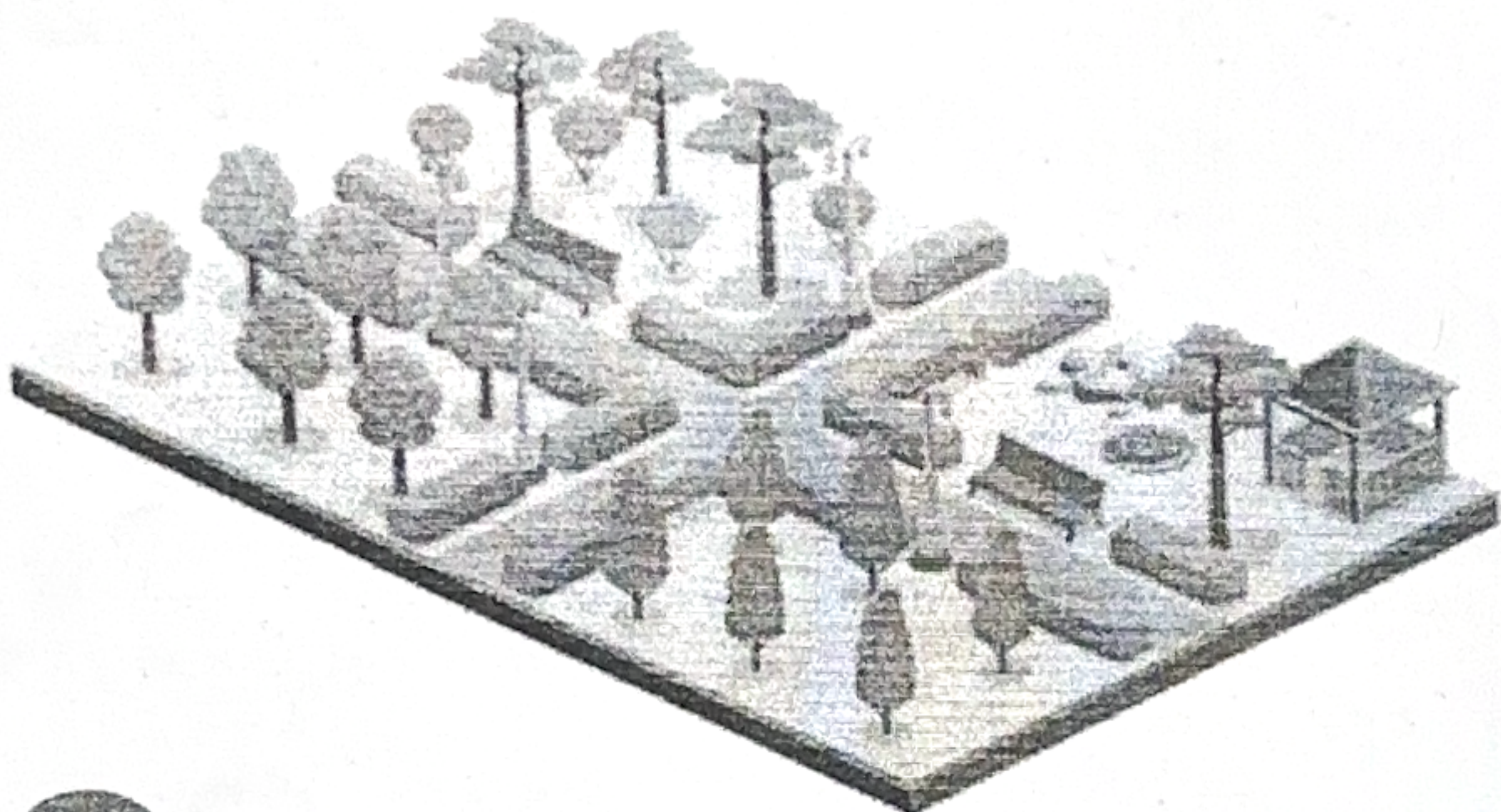
- Write the equation in two variables for both cases.
- How many possible solutions for the equation $3x + y = 4$ are there?
- Find the value of k if $x = -3$ and $y = 2$ are solutions for equation $2x + 3y = k$

$$-6 + 6 = 0 \quad k = 0$$

Or

Check if $x = -2$ and $y = 3$ is a solution of the equation $2x + 3y = 5$. (Show the working)

- A gardener designs a rectangular garden. The length of the garden is represented by $(x + 5)$ metres and width by $(x + 2)$ metres. Answer the following questions.



- Find the expression for the perimeter of the garden. $(x + 5)(x + 2)$
- Find the expression for the area of the garden.
- Find the value of the polynomial $x^2 - 3x + 2$ at $x = 2$. 0

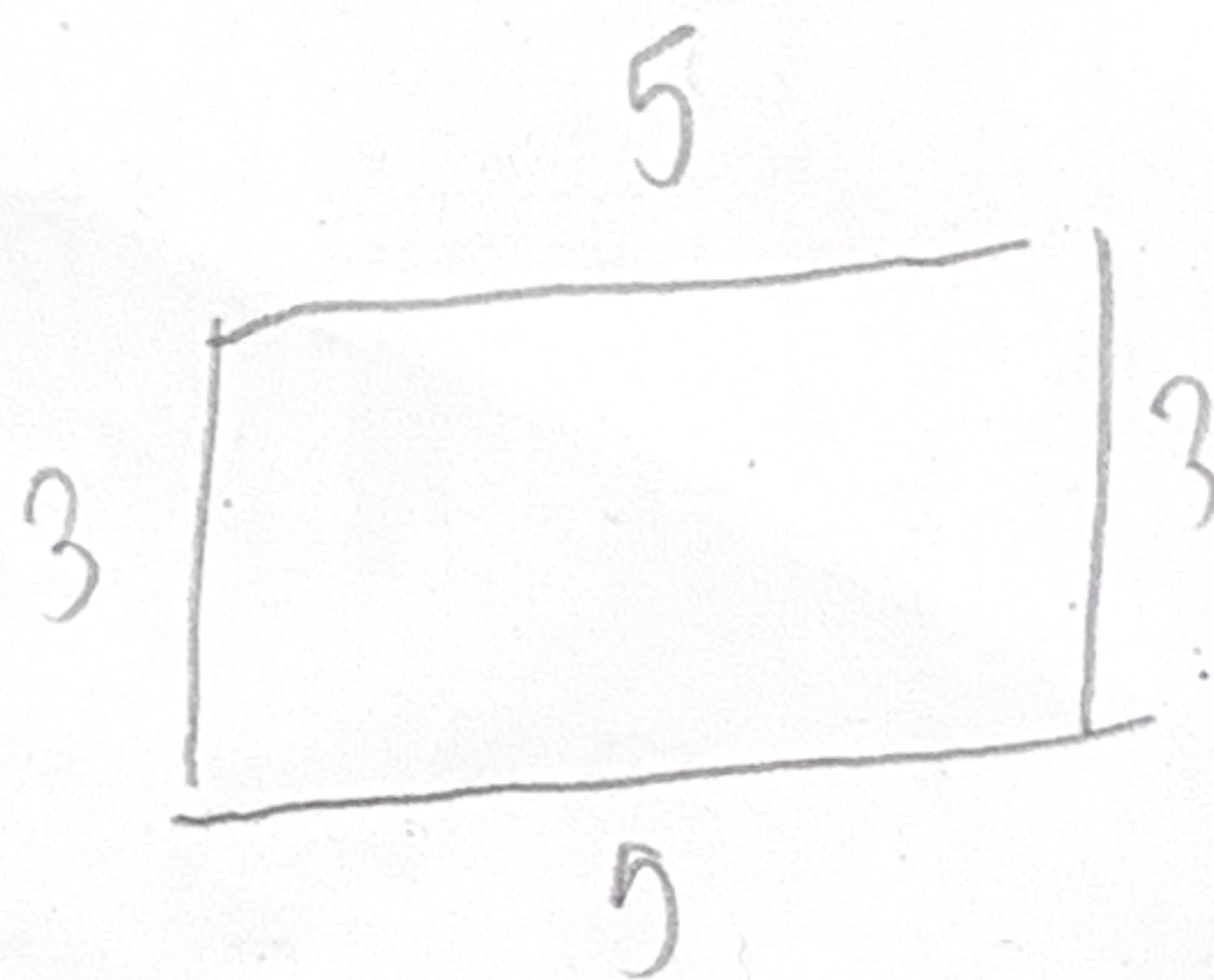
Or

Find the value of the polynomial $2x^2 + x - 2$ at $x = -1$.

$$\begin{aligned} x^2 - 3x + 2 \\ x = 2 \\ 2^2 - 3(2) + 2 \\ 4 - 6 + 2 \\ -2 + 2 \\ = 0 \end{aligned}$$

$$3 \times 5 = 15$$

$$2[(x + 5)(x + 2)]$$



$$2(3 \times 5) = 30$$