Unit 12 · Equation and Graph

HARDER PRACTICE QUESTIONS

Full marks 29

Write your answers on separate paper. Show your working. For a graph, use squared paper, make a table of three points for each line, and label the lines.

1 Three lines [4]

i. On squared paper, solve $y = 2x - 1$ and $x + y = 5$ by the graphical method.

ii. Does the line $x - y = -1$ pass through the same point? Show it in two ways: by drawing the line, and by working it out.

2 When the lines don't help [3]

On squared paper, draw the lines $x + y = 3$, $x + y = 6$ and $2x + 2y = 6$.

i. What is the solution of $x + y = 3$ and $x + y = 6$? Explain from the graph, and from the equations.

ii. What is the solution of $x + y = 3$ and $2x + 2y = 6$?

3 In a real setting [4]

Taxi A charges Rs 50 and then Rs 30 a km. Taxi B charges Rs 100 and then Rs 20 a km. (The fares are made up for the problem.)

i. Write an equation for each fare y (in rupees) for a trip of x km.

ii. On squared paper, draw both lines, with a suitable scale, and find where they cross.

iii. What does that point mean for a passenger?

iv. Which taxi is cheaper for 3 km, and which for 8 km?

4 A number and its digits [4]

The digits of a two-digit number add up to 9. When the digits are swapped, the number grows by 27. Let the tens digit be x and the units digit y.

i. Write the number, and the number with its digits swapped, in terms of x and y.

ii. Write two equations, and make the second as simple as you can.

iii. Solve them on squared paper by the graphical method, and find the number.

5 One root gives the other [3]

$x = 3$ is one root of $x^2 + kx - 12 = 0$. Find k and the other root.

6 Spot the error [3]

Find the mistake and correct it.

Rojina solved $(x - 2)(x + 3) = 14$ like this: "$x - 2 = 14$ or $x + 3 = 14$, so $x = 16$ or $x = 11$."
Test her answers, then solve the equation correctly.

7 A frame [4]

A photo 12 cm long and 8 cm wide has a frame of the same width x cm all round. The area of the photo and frame together is twice the area of the photo.

i. Write the length and the width of the framed photo in terms of x.

ii. Write an equation, and simplify it to the form $x^2 + bx + c = 0$.

iii. Find the width of the frame. Why is one of the roots no use?

8 Think [2]

Bibek solved $x^2 = 5x$ by dividing both sides by x, and got $x = 5$. Sneha says he has lost an answer. Who is right? How should the equation be solved?

9 Make your own [2]

Make up two different linear equations whose solution is $x = 3, y = -1$. Then make up a quadratic equation whose roots are that x and that y.