

QUADRATIC EQUATIONS

Activity – 4

1. What we have to do?

To convert a given quadratic equation to the form $(x + a)^2 - b^2 = 0$

2. What is required?

Graph sheets/ coloured paper, sketch pens, geometry box, glue stick, a pair of scissors

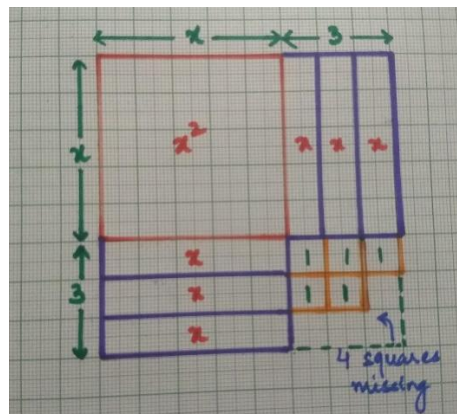
3. Time required: 25 min

4. What do we need to know?

Finding the roots of Quadratic equation using the method of completion of squares

5. How will you proceed?

- 1) Consider a Quadratic equation $x^2 + 6x + 5 = 0$
- 2) Take $x = 5$ units, to represent x^2 cut a square of side 5 units. Cut 6 rectangles of dimensions 5 unit $\times$ 1 unit and 5 squares of side 1 unit each.
- 3) Arrange the cut outs as shown above.
- 4) Arrange 5 small squares in left out area and complete the square by pasting 4 more squares each of side 1 unit.



- 5) As 4 extra squares each of side 1 unit are added to make a complete square, the same need to be removed to have the equation unaltered. This means

$$x^2 + 6x + 5 = 0$$

$$(x + 3)^2 - 4 = 0$$

$$(x + 3)^2 - 2^2 = 0$$

6. What have you observed?

The given Quadratic Equation $x^2 + 6x + 5 = 0$ can be written as _____

7. What have you learnt?

The given quadratic equation is represented geometrically in the form _____

8. What would you be interested in doing?

Repeat the same steps and hence represent $x^2 + 4x + 3 = 0$ in the form $(x + a)^2 - b^2 = 0$

Real Life Application

The above concept is used in solving day-to-day problems such as finding the age of mother/father and the child, dimensions of rectangular/square field, speed of stream and the boat in given conditions...
