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Solving Quadratic Equations

Unit 9 Lesson 3

SOLVING QUADRATIC EQUATIONS

Students will be able to:

Understand how to solve quadratic equations using their graphs and by square root method.

Key Vocabulary:

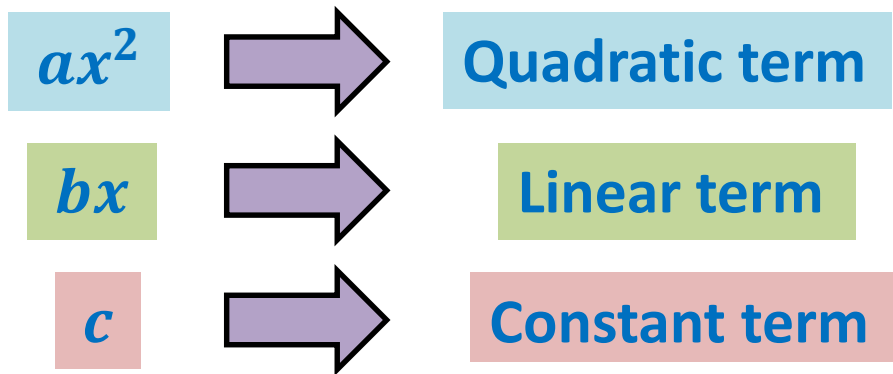
- Quadratic Equation
- Solution by Graph
- Real Solution
- Solution by Square Root Method

SOLVING QUADRATIC EQUATIONS

A **quadratic equation** is of the form:

$$f(x) = ax^2 + bx + c = 0$$

Where, $a \neq 0$.



SOLVING QUADRATIC EQUATIONS

Solution By Graphing

Consider the quadratic equation $f(x) = ax^2 + bx + c = 0$, $a \neq 0$.

If we graph the related quadratic function, the solutions of the quadratic equation are the x values where the graph touches the **x – axis**.

- A quadratic equation can have 2, 1 or 0 real numbered solutions.
- If the graph does not touch the x -axis, there exists no solution for the quadratic equation.

SOLVING QUADRATIC EQUATIONS

Problem 1: Find the solution of the quadratic equation $y = x^2 + x - 2 = 0$ by graphing.

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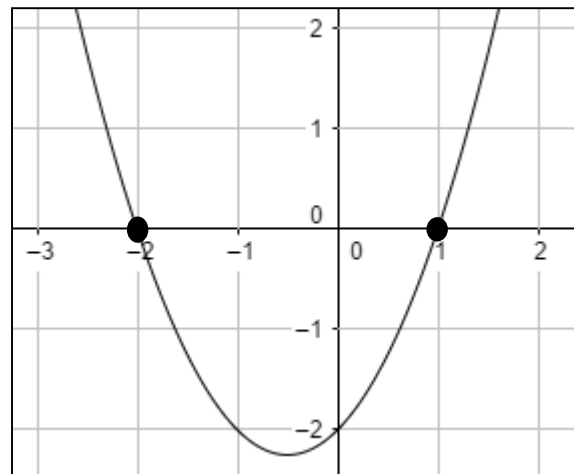
Graph the quadratic function $y = x^2 + x - 2$:

We see that the graph of the quadratic function cuts x-axis at two points i.e. $x = -2$ and $x = 1$.

So the solution of the quadratic equation is

$$x = -2$$

$$x = 1$$



SOLVING QUADRATIC EQUATIONS

Solution By Square Root

Consider the quadratic equation $f(x) = ax^2 + bx - c = 0$, $a \neq 0$.

If $b = 0$ and $a, c \neq 0$, then:

$$ax^2 - c = 0$$

$$x^2 = \frac{c}{a}$$

$$x = \pm \sqrt{\frac{c}{a}}$$

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Problem 2: Find the solutions of the quadratic equation $12x^2 - 108 = 0$.

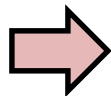
SOLVING QUADRATIC EQUATIONS

Problem 2: Find the solutions of the quadratic equation $12x^2 - 108 = 0$.

$$12x^2 - 108 = 0$$

$$x^2 = \frac{108}{12}$$

$$x^2 = 9$$



$$x = \pm 3$$