

Review of Grade 10 Quadratics - Part 1

Quadratic Relation: A relation (function) defined by a quadratic equation of the form $y = ax^2 + bx + c$, where a , b , and c are real numbers and $a \neq 0$.

Roots (Zeros, X – intercepts): The solutions of an equation $ax^2 + bx + c = 0$. Those are any values of x for which the value of the function $y = 0$. Those correspond to x -intercepts on the graph of the function.

Quadratic Formula: $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ Does it always work?

Example 1: Simplest Quadratic Equations

a) $x^2 = 64$

b) $(x - 4)^2 = 49$

Example 2: Solve the following equations

a) $5x^2 - 4 = 41$

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

c) $3x(x - 4) = 2(x + 1) + 3$

Example 2:

Solve by Quadratic Formula

a) $3x^2 - 5x + 2 = 0$

b) $(x + 3)(5x + 1) = (2x + 1)(x + 7)$

Example 3:

A rectangle, 3 cm longer than it is wide, has a diagonal 15 cm long. Find the dimensions of the rectangle.

Example 4:

An Acapulco diver dives into the sea from a height of 35 m. His height, h , in metres, t seconds after leaving the cliff is given by: $h = -4.9t^2 + t + 35$. How long is it until he reaches the water?

Review of Grade 10 Quadratics (Day 2)

To determine the maximum or minimum value of a quadratic function in the form $y = ax^2 + bx + c$ by completing the square, rewrite the function in the form $y = a(x-h)^2 + k$. The maximum or minimum value of the function is k , when $x = h$. If $a > 0$, k is the minimum value of the function. If $a < 0$, k is the maximum value of the function.

Vertex of a quadratic function: The highest or lowest point of a parabola.

Axis of symmetry: The fold line of a symmetrical figure.

Completing the Square: To solve a quadratic equation by completing the square, first complete the square, and then take the square root of both sides to find the roots.

Example 1:

Solve by completing the squares

a) $x^2 + 14x + 40 = 0$

b) $-12x^2 - 2x + 1 = 0$

Example 2:

Find the maximum value of the function $y = 5x - 3x^2$ by completing the square.

Example 3:

For $y = 2x^2 + 4x - 15$, determine the zeros, equation of the axis of symmetry and the vertex of the function. Sketch the graph.

(Use factoring or Completing the Squares)

Example 4:

The height, in metres, of a diver who has jumped from a springboard is given by the relation, $h = 36 - 16t - 8t^2$.

- What is the height of the springboard?
- What is the height of the diver one second after he has jumped?
- How long does it take for the diver to reach a height of 12 metres?
- How long does it take for the diver to reach his maximum height?
- What is the maximum height of the diver?

