Quadratic Function

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Objectives

Objectives for today:

- Introducing specific vocabulary.
- Quick revision of quadratic function.
- Factorising Quadratics.
- Proving Vieta's formulas.
- Carrying out gained knowledge by working out some word problems.

Quick Revision

Forms of Quadratic Function

- $f(x) = ax^2 + bx + c$ is called the **standard form**.
- $f(x) = a(x - x_1)(x - x_2)$ is called the **factored form**, where x_1 and x_2 are the roots of the quadratic function.
- $f(x) = a(x - h)^2 + k$ is called the **vertex form**.

Delta Δ

Δ determines tells us how many solutions quadratic equation have:

$$\text{number of solutions} = \begin{cases} 2 & \text{when } \Delta > 0 \\ 1 & \text{when } \Delta = 0 \\ 0 & \text{when } \Delta < 0 \end{cases}$$

The Quadratic Formula

$$x = \frac{-b \pm \sqrt{\Delta}}{2a}$$

Graph of Quadratic Function

Figure 1:Graph of $f(x) = ax^2|_{\{0.1,0.3,1.0,3.0\}}$

Factorising a Quadratic

Factorising a quadratic means putting it into two brackets, and is useful if you're trying to draw a graph of a quadratic solve a quadratic equation. It's pretty easy if $a = 1$ (in $ax^2 + bx + c$ form), but can be a real pain otherwise.

Factorising- Tasks

1. Factorise $x^2 - x - 12$.