LaTeX to PDF and MathJax: Example 1

## LaTeX to PDF and MathJax: Example 1

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### [Contents](#x1-1000)

1 [Quadratic equations](#x1-50001)  
 1.1 [Solutions to a quadratic equation](#x1-60001.1)  
 1.2 [The discriminant](#x1-70001.2)

### [List of Figures](#x1-2000)

1 [Examples of quadratic functions with zero, one and two real roots.](#x1-70031)

### [List of Tables](#x1-3000)

1 [Number of real roots of a quadratic equation, given the discriminant](#x1-70011)

### [Using this document](#x1-4000)

This is an example of a document compiled from LATEX  into multiple formats:

* [Standard print PDF](https://stem-enable.github.io/LaTeXtoPDFandMathJax-Example1/LaTeXtoPDFandMathJax-1-standard.pdf)
* [Clearer print PDF](https://stem-enable.github.io/LaTeXtoPDFandMathJax-Example1/LaTeXtoPDFandMathJax-1-clear.pdf)
* [Accessible web format](https://stem-enable.github.io/LaTeXtoPDFandMathJax-Example1/)
* [Accessible Word document](https://stem-enable.github.io/LaTeXtoPDFandMathJax-Example1/LaTeXtoPDFandMathJax-1.docx)

The outputs can be used to test setups and as a first example for students to try out.

### 1 [Quadratic equations](#QQ2-1-5)

A quadratic equation is an equation with the form where represents an unknown and , and are known numbers with .

#### 1.1 [Solutions to a quadratic equation](#QQ2-1-6)

A solution to a quadratic equation is a value of such that the equation balances. The solutions to quadratic equations can be found by using the quadratic formula:

|  |  |
| --- | --- |
|  | (1) |

Example.  
For instance, the solutions to are:

Hence, or .

#### 1.2 [The discriminant](#QQ2-1-7)

Definition (Discriminant).  
The discriminant of a quadratic equation with coefficients is:

Remark.  
Note that this is the expression beneath the square root symbol in the quadratic formula ([1](#x1-6001r1)).

We can use the discriminant to determine the number of real roots of a quadratic equation. The number depends on the value of as in table [1](#x1-70011).

|  |  |
| --- | --- |
|  |  |
| Value of | Real roots |
|  |  |
|  | Two, distinct |
|  | One, repeated |
|  | Zero |
|  |  |
|  |  |

Table 1: Number of real roots of a quadratic equation, given the discriminant

Figure [1](#x1-70031) shows an example of each possibility[1](#fn1x0).

Horizontal and vertical axes without scale with three separate quadratic graphs are shown. The left most quadratic opens upwards, crosses the horizontal axis twice, is labelled capital delta greater than 0 and is drawn in blue. The central quadratic opens upwards, does not cross the horizontal axis, is labelled capital delta less than 0 and is drawn in yellow. The right most quadratic opens downwards, touches the horizontal axis at a single point, is labelled capital delta equals 0 and is drawn in red. 

Figure 1: Examples of quadratic functions with zero, one and two real roots.

[1](#fn1x0-bk)The image is due to Olin, CC-BY-AS 3.0 downloaded from [Wikimedia Commons](https://commons.wikimedia.org/wiki/File:Quadratic_eq_discriminant.svg)