Factoring quadratics: Finding solutions to quadratic equations using the formula above is also the first step to a systematic method of factoring quadratics. Indeed, if you have to factor the quadratic expression $ax^2 + bx + c$ then

Step 1:

Step 2:

- if $D > 0$ then

- if $D = 0$ then

- if $D < 0$ then

Examples:

1.8.4 Other types of equations

Textbook Section 2.2

In many cases, an equation may look complicated at first but can be manipulated and simplified into either a linear or quadratic equation. We already saw some examples earlier, and here are some other common examples.

Equations with absolute values

Example:

Higher-order polynomial which can be factored

Example:

Equations which reduce to quadratic equations with a change of variables

Example:

Equations with radicals

Example:

1.9 Graphs and coordinates

Textbook Section 1.4 and 1.5

1.9.1 Graphs

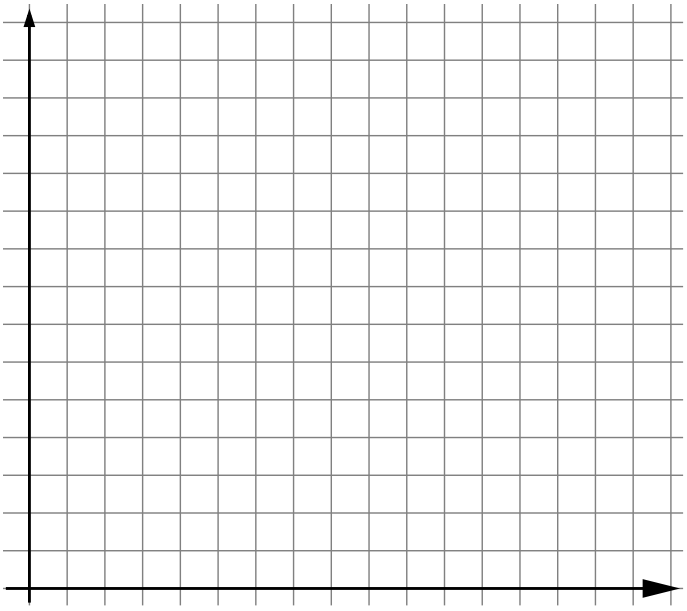
Graphs are useful visual aids to representing the relationship between two quantities. Graphs can be made using real data, or mathematical relationships.

Real data

Real data is often available in the form of a table of numbers, as for example

Year	World population (bilions)
1965	3.345
1975	4.086
1985	4.850
1995	5.687
2005	6.454

However, it is easier to interpret it when plotted as a graph:

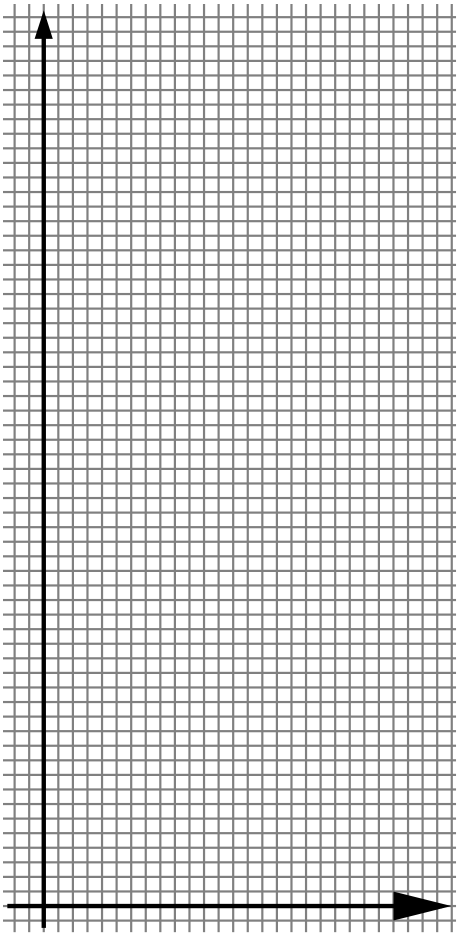


Mathematical relationship between quantities

In other cases, a mathematical model is used to construct and study a relationship between two quantities. This relationship is again very easy to visualize with a graph.

Example: A pair of rabbits reproduces once every month, giving birth to two rabbits. Assuming that after 1 month the newly born pair is already ready to reproduce implies that the rabbit population doubles every month.

How quickly the rabbit population reproduces is dramatically illustrated on a graph:



Vocabulary

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1.9.2 Equations of lines

Textbook Section 1.6

A line is uniquely defined either by

-
-

Note that if you know the coordinates of the two points, you can calculate the slope of the line going through the points:

Definition:

Once the slope of a line is known (see above) there are two ways of writing the line equation:

- The slope-intercept formula:
- The point-slope formula:

Important:

-
-
-
-

Examples:

- Finding a line going between two points:

- Finding a line going through one point, with a given slope:

- Finding the $x-$intercept of a given line equation:

- Finding the intersection of two lines:

- Finding the equation of a line perpendicular to another line:

1.9.3 Equations of circles

Textbook Section 1.7 (page 63-67)

Example 1: the circle centred on the origin.

Problem: Can we describe a circle of radius R centered on the origin by a mathematical equation? Yes! it's easy....

Example 2: the circle centred on another point.

Problem: Can we describe a circle of radius R centered on the origin by a mathematical equation? Yes! it's easy....