0.1 Linear equations

$$x + 2 = y \tag{1}$$

This is an example of a **linear equation**, one that has two variables, x and y, and it describes how the value of one of the variables depends on the value of the other variable.

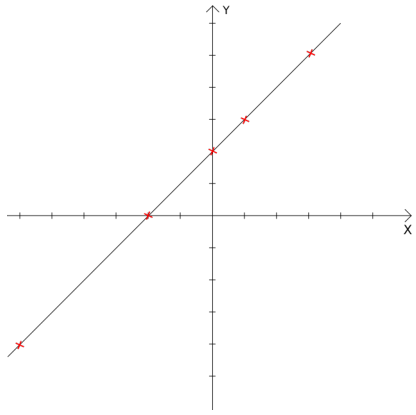
What makes it **linear** is that every variable is only raised to the first power, so *this*

$$x^2 + 2 = y$$

is **not** a linear equation.

Lets plot (draw) equation (1), for a few diferent values of x, say, -6, -2, 1 and 5.

As you can see, the graph of this equation is a **straight line**, which is true for all linear equations



0.2 Linear equation with multiple variables

$$x + 9y + z = 3 \tag{2}$$

Lets now extend our definition of a linear equation to include more variables. (1) had only x and y, but (2) has 3 variables, x, y and z.

The 9 in front of the y? That is called a *coefficient*, and the 3 on the right-hand-side is called a *constant*

Because we will (eventually) run out of letters in the alphabet, we write our equations like this:

$$c_1x_1 + c_2x_2 + c_3x_3 + \ldots + c_nx_n = b$$

Here the c's are the *coefficients*, the x's are the *variables* and the b is (spoiler) the *constant* .
It may look complex the first time, but you'll get used to reading equations like this.

Lets look at an example: Jimmy goes to the store to buy cokes, snickers and apples. Jimmy knows that a can of coke is 2.2\$, snickers is 1.6\$ and an apple is 3.0\$
If c_1 is price of coke, c_2 is price of snickers and c_3 is price of apples, our equation would look like this

$$2.2x_1 + 1.6x_2 + 3.0x_3 = b$$

Jimmy needs a couple of cokes (x_1) and four apples (x_3). Jimmy has 20\$.

How many snickers bars can he buy with the leftover money?

$$2.2 \cdot 2 + 1.6x_2 + 3.0 \cdot 4 = 20$$

Do the math and help Jimmy get his snickers by solving for x_2.