7.1 Absolute Value

Two cars travel from the same place, one heading east and one heading west, opposite directions. They each travel 7km.

We use integers to show direction.

But, if we want to compare the amount of fuel used by each car, we don't care about direction, the positive and negative. We only care about the distance **(or magnitude)** of each car. In math, we use these signs to show distance $|\ |$

Distance from something is called absolute value.

$$|5| = \qquad\qquad |-5| =$$

Absolute value is a distance, so it's always positive.

For any real number, *x*, the **absolute value** is written as $|x|$ and is always a positive value.

A piecewise definition is given by:

$$f(x) = |x| = \begin{cases} x, & if\ x \geq 0 \\ -x, & if\ x < 0 \end{cases}$$

If the number is positive, it will remain positive.

If the number is negative, it will be the negative of a negative value which will make it positive.

Absolute values are to be treated as if there was a bracket around them, unless otherwise indicated.

Example: Evaluate

a.) $|12|$

b.) $|-382|$

c.) $|-4-10|$

d.) $|3-5(7)|$

e.) $5|-2|+|-3|$

f.) $-3|\frac{4}{5}|$

g.) $|(-2)^3 - 2^3|$

h.) $(|3^2 - 4^2|)^2$