2.1: Properties of functions

A function is a rule that assigns to each element in some set D, exactly one element, $f(x)$, to a set B.
The domain D is the set of all possible inputs.
The range R is the set of all corresponding outputs.

Example. For the following functions, find the domain and the range:

1. $g(x) = \sqrt{2x - 4}$

2. $h(x) = \frac{1}{x^2 - 25}$

Example. Given

$$f(x) = x^2 - 5.$$

Find:

1. $f(x + h)$

2. $f(x + h) - f(x)$

3. $\frac{f(x+h)-f(x)}{h}$

Definition. The vertical line test: A graph represents a function if and only if every vertical line intersects the graph in at most one point.