

## Week 1 - Library of Functions

An algebraic function is one that involves addition, subtraction, multiplication, division, rational powers, and roots.

e.g.  $f(x) = x^2 + \frac{\sqrt{5-x}}{x(x-1)}$

What does this mean?

A rational function is a special type of algebraic function of the form  $f(x) = \frac{p(x)}{q(x)}$ , where  $p, q$  are polynomials.

e.g.  $\frac{x+1}{x^2+2}$ ,  $\frac{x^3}{x-1}$ ,  $x^2+5x+3$ , ...

A root function is a power function of the form:  $f(x) = x^{\frac{1}{n}}$ , where  $n$  is a positive integer  $> 1$ .

If a function is not algebraic, it is called transcendental. This includes functions that are:

- trigonometric
- exponential
- logarithmic

Logarithmic functions are of the form  $f(x) = \log_b(x)$ .

Logarithmic functions are of the form  $y = \log_b(x)$ .

Recall:  $\log_b(x) = y$  means  $b^y = x$

$$b \geq 0, b \neq 1$$