1.1 Power Functions

A **polynomial expression** is an expression of the form:

$$a_n x^n + a_{n-1} x^{n-1} + a_{n-2} x^{n-2} + \ldots + a_1 x + a_0$$

Where:

- **n** is a whole number
- **x** is a variable
- the coefficients $a_0, a_1, a_2, \ldots, a_n$, are real numbers
- the degree of the function is **n**, the exponent of the greatest power of **x**
- a_n, the coefficient of the greatest power of x, is the leading coefficient
- a_0, the term without a variable, is the constant term

A **polynomial function** has the form:

$$f(x) = a_n x^n + a_{n-1} x^{n-1} + \ldots + a_1 x + a_0$$

A power function is the simplest type of polynomial function, $f(x) = a x^n$

Investigate: pg 5, 6

Definitions:

End Behaviour

the behaviour of the y values as x increases ($x \to \infty$) and as x values decrease ($x \to -\infty$)

Line of symmetry

is a line $x = a$ that divides the graph into two parts such that each part is a reflection of the other in the line $x = a$

Point of symmetry

A point (a, b) if each part of the graph on one side of (a, b) can be rotated 180° to coincide with the part on the other side of $(a,$

Example #1: Identify whether each is a polynomial function:

a) $p(x) = \cos x$

No

TRIG FUNCTION

b) $h(x) = -7x$

Yes

linear

c) $f(x) = 2x^4$

yes

d) $y = 3x^5 - 2x^3 + 2x^2 - 1$

yes

e) $k(x) = 8^x$

No

Exponential Function

f) $y = x^{-3}$

No