Polynomial Equations

Form: $ax^n + bx^{n-1} + \ldots + c$

1. Do not have a fraction with a variable in the bottom.

2. Exponents are all whole numbers for variables.

Ex: $f(x) = 3x^4 + 2x^3 - 6x + 5$

$$f(x) = \sqrt{3}x^2 - \pi x + \frac{4}{3}$$

Non-examples: $f(x) = x^{-2}$ $f(x) = x^{\frac{1}{2}}$

Domain = all real numbers

Increasing: Going uphill from left to right.

Decreasing: Going downhill from left to right.

These are written as an interval of $x$-values.
Points where functions change from increasing to decreasing are called **turning points**. They are in the form \((x, y)\).

Turning points attain a **maximum** or **minimum** value at their coordinates. The value of this maximum or minimum is the \(y\)-coordinate of the point. There are two kinds of maximums and minimums (also called extrema.)

**Absolute Maximum**: The largest \(y\) value on the graph.

**Local Maximum**: The largest \(y\) value “nearby”.

**Absolute Minimum**: The smallest \(y\) value on the graph.

**Local Minimum**: The smallest \(y\) value “nearby”.

☆Local extrema do not occur at endpoints!☆