MCT 4C

Introduction to Polynomial Functions

Recall: A polynomial is a sum of terms that are each the product of a constant and a power of *x* with a whole number exponent

Examples of Polynomials:

- $3x^3 – 4x^2 + 5x – 7$
- $-2x^4 – 6x^2$
- $x^3 – 3x^2 + 2x – 1$

Examples of Polynomial Functions:

- $f(x) = 3x^3 – 2x^2 + 4x + 1$
- $g(x) = -5x^4 + 2x^2 – 1$

Polynomials can be represented using a set of ordered pairs, a table of values, an equation, a graph and a mapping.

The degree of a polynomial function is the highest exponent of the polynomial when written in expanded form.

ie. $f(x) = 4x^4 – 3x^3 + 2x – 7$ has a degree of _____

When a polynomial is given in factored form, the degree can be found by adding the exponents on each factor.

ie. $f(x) = (x – 3)^2(x + 4)(2x – 1)$ has a degree of _____

Example: Complete the chart.

Polynomial Function	Degree
$f(x) = (x -7)(x + 1)$	
$g(x) = (3x – 4)^2(x -1)$	
$h(x) = (x + 1)^3(x – 2)^2$	

Special names are given to some polynomial functions as indicated in the following table:

Degree	Type
1	Linear
2	Quadratic
3	Cubic
4	Quartic
5	Quintic

Polynomial functions can be described in terms of their **end behaviour**. This refers to which quadrant the function originates in (on the left) and where it travels to (on the right). Eg. a line with a positive slope begins in quadrant 3 and ends in quadrant 1 so we say the end behaviour is Q3 → Q1

Recall:

Q2	Q1
Q3	Q4