3.2 Characteristics of Polynomial Functions

Math Learning Target:

"I can identify properties of any polynomial function."

A **leading coefficient** is the coefficient of the term with the highest exponent for powers of x in the polynomial expression or function. For example, 4 is the leading coefficient in the polynomial function: $f(x) = -2x + 7 + 4x^3$

A **turning point** is a point on a curve where the relation changes from increasing to decreasing, and vice versa. (*For an example see p. 30*)

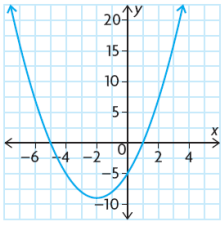
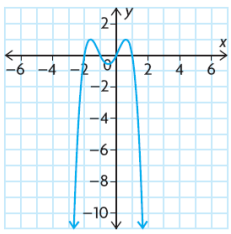
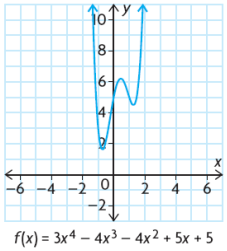
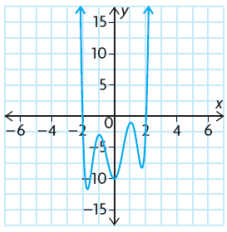
An **absolute maximum** is synonymous with global maximum.
An **absolute minimum** is synonymous with global minimum.
(*For an example see p. 131*)

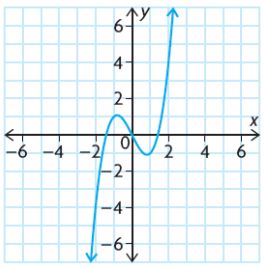
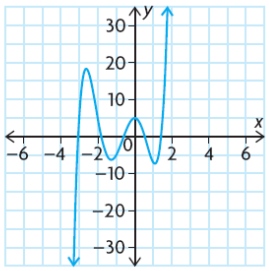
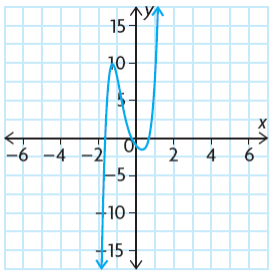
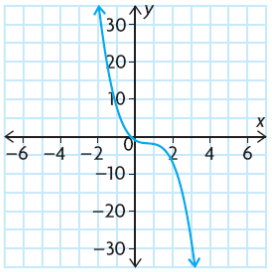
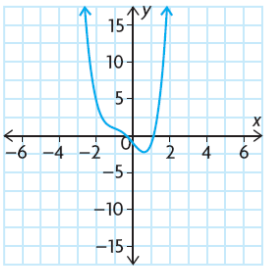
INVESTIGATE the Math. pp. 129-131 **A-E and G-M.** Use desmos

A chart for parts A and E has already been created for you.
Answer the rest of the questions in your notebook.

A.

"Is the degree of the function an even number or an odd number?"

	Degree	Even or Odd Degree	Leading Coefficient	End Behaviours $x \to -\infty$	End Behaviours $x \to +\infty$	Number of turning points
a)  $f(x) = x^2 + 4x - 5$	2	even	1	$y \to \infty$	$y \to \infty$	1
b)  $f(x) = -x^4 - 2x^3 + x^2 + 2x$	4	even	-1	$y \to -\infty$	$y \to -\infty$	3
c)  $f(x) = 3x^4 - 4x^3 - 4x^2 + 5x + 5$	4	even	3	$y \to \infty$	$y \to \infty$	3
d)  $P(x) = 2x^6 - 12x^4 + 18x^2 + x - 10$	6	even	2	$y \to \infty$	$y \to \infty$	5

	Degree	Even or Odd Degree	Leading Coefficient	End Behaviours $x \to -\infty$	End Behaviours $x \to +\infty$	Number of turning points
e)  $f(x) = x^3 - 2x$	3	odd	1	$y \to -\infty$	$y \to \infty$	2
f)  $f(x) = 2x^5 + 7x^4 - 3x^3 - 18x^2 + 5$	5	odd	2	$y \to -\infty$	$y \to \infty$	4
g)  $f(x) = 5x^5 + 5x^4 - 2x^3 + 4x^2 - 3x$	5	odd	5	$y \to -\infty$	$y \to \infty$	2
h)  $f(x) = -2x^3 + 4x^2 - 3x - 1$	3	odd	-2	$y \to \infty$	$y \to -\infty$	0
i)  $f(x) = x^4 + 2x^3 - 3x - 1$	4	even	1	$y \to \infty$	$y \to \infty$	1

E.

	Even Functions	**Odd Functions**	**Neither**
i) $f(x) = x^4 - 2x^2 + 1$			

Read and **STUDY** p.135

Complete pp. 136-138 #1ab, 2ab, 3, 4abf, 5, 7ad, 10, 13, 14, 16