

Characteristics of Polynomial Functions (3.2)



"I know what a polynomial function is. I can identify all properties of any polynomial function. I can apply what I have learned in familiar and unfamiliar settings."

A **polynomial function** is a function that is the sum of one or more powers of an independent variable (such as x) with real number coefficients and exponents that are non-negative integers. In other words,

$$f(x) = a_n x^n + a_{n-1} x^{n-1} + a_{n-2} x^{n-2} + \dots + a_2 x^2 + a_1 x + a_0$$

where $a_n \neq 0$ and n is a non-negative integer

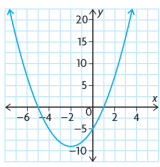
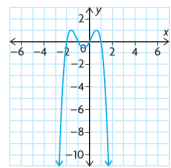
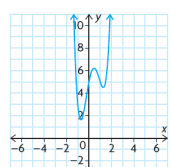
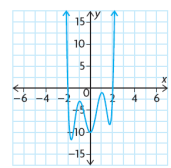
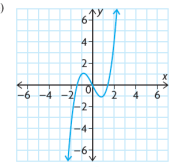
A **leading coefficient** is the coefficient of the term with the highest exponent for powers of x in the polynomial, which is a_n (where $a_n \neq 0$)

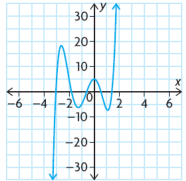
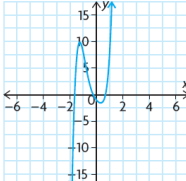
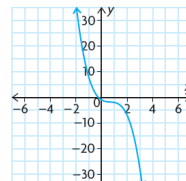
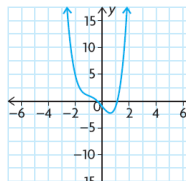
The **degree** of a polynomial function is the exponent of the power of $a_n x^n$ (n), as long as $a_n \neq 0$

A **turning point** is a local minimum or local maximum.

INVESTIGATE the Math. Page 129 **A-E** and **G-M**. Use [desmos](https://www.desmos.com)

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

A.	Degree	Even or Odd Degree	Leading Coefficient	End Behaviours		Number of turning points
				$x \rightarrow \infty$	$x \rightarrow -\infty$	
<p>a)  $f(x) = x^2 + 4x - 5$</p>						
<p>b)  $f(x) = -x^4 - 2x^3 + x^2 + 2x$</p>						
<p>c)  $f(x) = 3x^4 - 4x^3 - 4x^2 + 5x + 5$</p>						
<p>d)  $P(x) = 2x^6 - 12x^4 + 18x^2 + x - 10$</p>						
<p>e)  $f(x) = x^3 - 2x$</p>						

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

E. **desmos**

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

Keep working on...Page 129 **A-E** and **G-M**.

Read and study: Page 145

MathSIP! Page 136 #1ab, 2ab, 3, 4abf, 5, 7ad, 10, 13, 14, 16