Math 115E Activity 20

Chapter 7: Polynomials

Graphing Quadratic Functions

Definition: *A polynomial is a function $f(x)$ of the standard form:*

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

where $a_n, a_{n-1}, \ldots, a_2, a_1, a_0$ are real numbers and n is a non-negative integer

For the following questions, circle which functions are polynomials based on the Definition above

#1 $f(x) = x^2 + \pi$ #5 $f(x) = \frac{1}{x^2 + x}$ #9 $f(x) = 2^x - x^2$

#2 $f(x) = \frac{1}{5}x - x^2$ #6 $f(x) = -\pi x^2 - \pi x$ #10 $f(x) = sin(x) - x$

#3 $f(x) = x^x - 2$ #7 $f(x) = \frac{1}{2}x - x^{-1/2}$ #11 $f(x) = x^{-1} + x^{-2}$

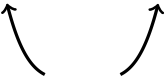#4 $f(x) = x^{1/3} - x^2$ #8 $f(x) = x^3 - x^2 + 1$ #12 $f(x) = 3x^\pi - x - 1$

For each problem you did NOT circle, briefly explain why it was not a polynomial

For the following, write down new examples of functions that are not already written above

- Two functions that are polynomials

- Two functions that are NOT polynomials

Definition:

- *The highest power of x that shows up in a polynomial is called the **degree** of the polynomial*

- *The number in front of the x^n with the highest power is called the **leading coefficient***
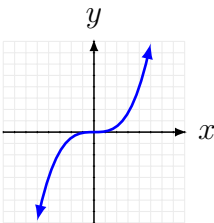
	Even Degree		**Odd Degree**	
Sign of Leading Coeff	Positive (+)	Negative (−)	Positive (+)	Negative (−)
End Behavior				

For each polynomial below, find the following:
(a) the degree, **(b)** the leading ceeffficient, and **(c)** the rough sketch of the graph and end behavior
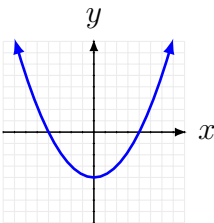
EX#1 $f(x) = -x^2 + 4$
Degree: 2 (even),
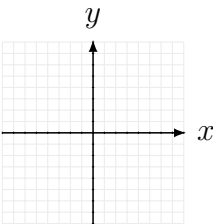Leading Coeff: -1 (negative)
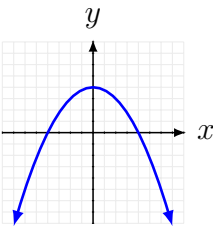
EX#2 $f(x) = 2x^3 + x$
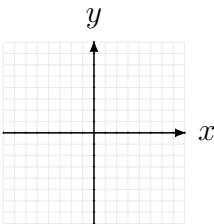Degree: 3 (odd)
Leading Coeff: 2 (negative)

EX#3 $f(x) = 4x^6 - 2x - 1$
Degree: 6 (even),
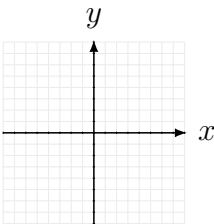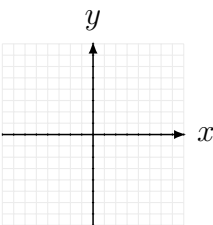Leading Coeff: 4 (positive)

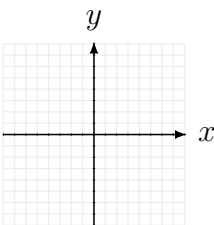#1 $f(x) = x^3 + 4$

#2 $f(x) = 8x^2 - x + 2$

#3 $f(x) = -3x^8 - 2x^3 + x^2$

#4 $f(x) = x^2 + 2x + 4$

#5 $f(x) = -6x^3 + 2x^2 + x$

#6 $f(x) = -x^5 + 10x + x$