

Math 115E Activity 20

Chapter 7: Polynomials

Graphing Quadratic Functions

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

$$f(x) = a_nx^n + a_{n-1}x^{n-1} + \cdots + a_2x^2 + a_1x + a_0$$

where $a_n, a_{n-1}, \dots, a_2, a_1, a_0$ 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**

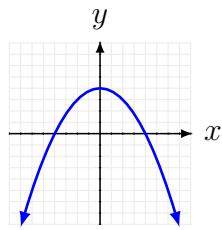
	Even Degree		Odd Degree	
Sign of Leading Coeff	Positive (+)	Negative (-)	Positive (+)	Negative (-)
End Behavior				

For each polynomial below, find the following:

(a) the degree, (b) the leading coefficient, and (c) the rough sketch of the graph and end behavior

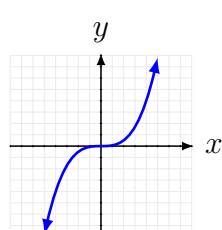
EX#1 $f(x) = -x^2 + 4$

Degree: 2 (even),
Leading Coeff: -1 (negative)



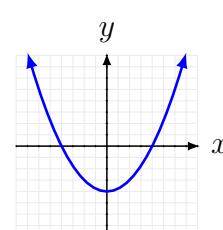
EX#2 $f(x) = 2x^3 + x$

Degree: 3 (odd)
Leading Coeff: 2 (negative)



EX#3 $f(x) = 4x^6 - 2x - 1$

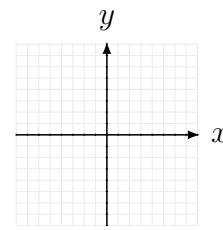
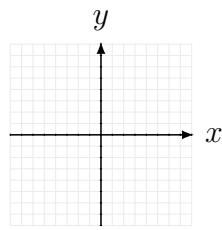
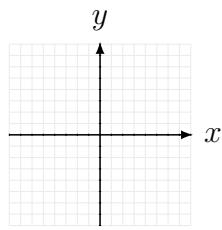
Degree: 6 (even),
Leading Coeff: 4 (positive)



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

