

## Math 115E Activity XX

Old Activity 11-5 and 11-7

### Graphing Quadratic Functions

**Definition:** A function  $f(x)$  of the form  $f(x) = a_nx^n + a_{n-1}x^{n-1} + \dots + a_2x^2 + a_1x + a_0$  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

$$\#1 \ f(x) = x^2 + \pi$$

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

$$\#9 \ f(x) = 2^x - x^2$$

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

$$\#6 \ f(x) = -\pi x^2 - ex$$

$$\#10 \ f(x) = \sin(x) - x$$

$$\#3 \ f(x) = x^e - 2$$

$$\#7 \ f(x) = e^2x - \pi$$

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

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

$$\#8 \ f(x) = x^3 - x^2 + 1$$

$$\#12 \ f(x) = 3x^\pi - x - 1$$

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

**Reminder:** Given a function  $f(x)$ , coordinate points of the form  $(x, 0)$  on the graph  $f(x)$  are the  $x$ -intercepts, and coordinate points of the form  $(0, f(0))$  on the graph of  $f(x)$  are the  $y$ -intercepts

**Definition:** Given a polynomial  $f(x)$ , the number of times a given term  $(x - c)$  appears in the factored form of  $f(x)$  is called the **multiplicity**