

Name: \_\_\_\_\_

Date: \_\_\_\_\_

**UNIT 2**

**LESSON 1**

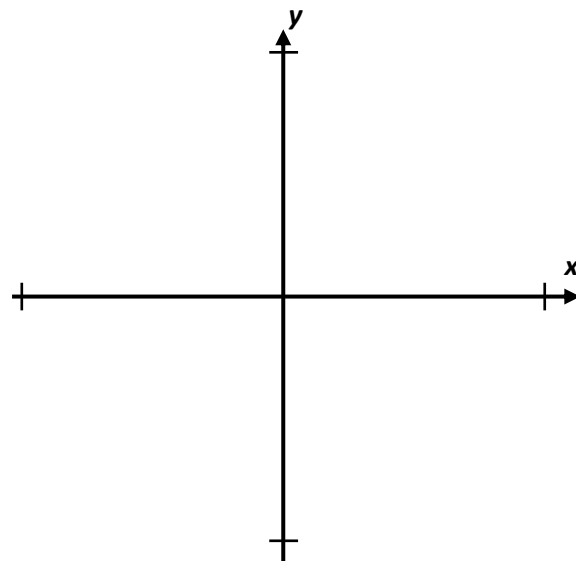
**AIM: HOW DO WE IDENTIFY A POLYNOMIAL'S MULTIPLICITY**

Do Now: Given the following quadratic equations, answer the following questions:

I.  $x^2 - x - 6 = 0$

II.  $x^2 - 2x + 1 = 0$

- a) What is the degree of each polynomial?
- b) How many roots will you expect there to be?
- c) What is the leading coefficient of the equations?
- d) Find the roots of the quadratic equations algebraically and sketch on the same graph (below) **without** the use of a calculator.



WORD	DEFINITION
Multiplicity	

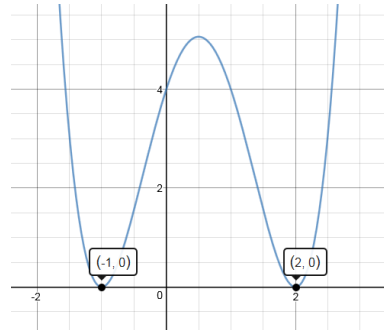
- When the multiplicity is EVEN, the graph will \_\_\_\_\_ at the root.
- When the multiplicity is ODD, the graph will \_\_\_\_\_ at the root.

**PRACTICE:**

For questions #1-2,

- Find the zeros of the following polynomial functions.
- State their multiplicities
- State the degree of the polynomial.
- Write the equation in factored form.

1)



3) State a polynomial that has the roots given  $\{4, -5, 0\}$  and 1 as the leading coefficient.

4) Suppose we know that the polynomial equation has three real solutions and that one of the factors of  $4x^3 - 12x^2 + 3x + 5 = 0$  is  $(x - 1)$ . Find all the solutions to the given equation.



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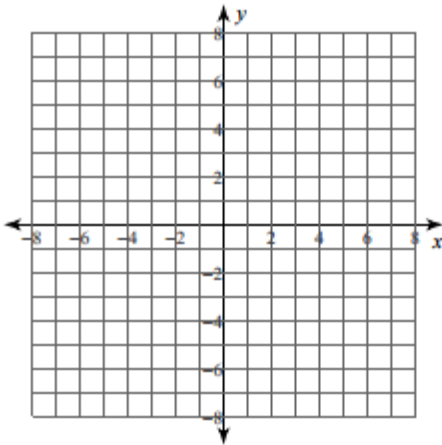
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**LAB #4**

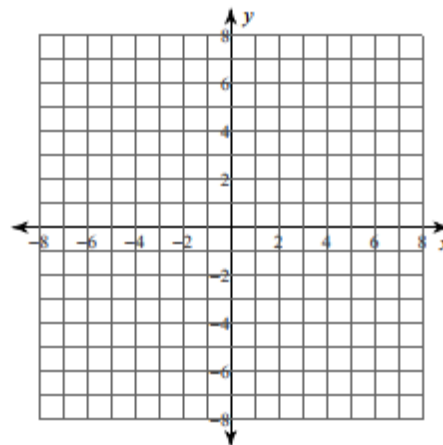
For each of the following polynomial functions:

- State the degree of the function
- State all zeroes and their multiplicities
- Sketch each graph.

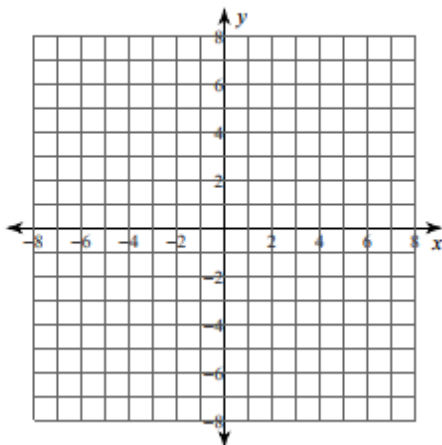
1)  $f(x) = -x^3$



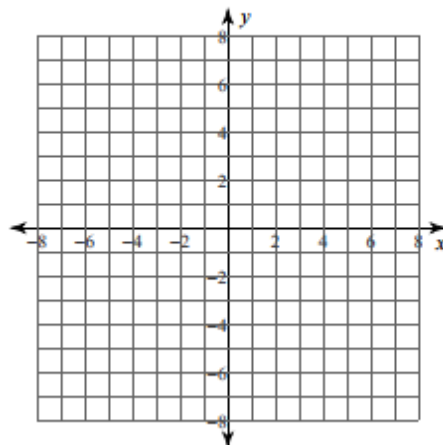
2)  $f(x) = 2x^3 - 3x^2$



3)  $f(x) = x^4 + x^3 - 4x^2 - 4x$



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



5) Find all zeroes of the following functions with their multiplicities and state the degree:

$f(x) = (x - 4)(x + 4)^3$	$f(x) = (x - 3)(x + 1)$
$f(x) = (x - 1)^2 \cdot (x + 3)^5$	$f(x) = x(x - 2)(x + 1)$

6) Suppose one of the factors of  $x^3 - 10x^2 + 27x - 18$  is  $(x - 3)$ , what are the other two *factors*?

7) Suppose we know that the polynomial equation has three real solutions and that one of the roots of  $x^3 + 3x^2 - 4x - 12 = 0$  is  $x = -3$ . State all *solutions*.

8) Factor:  $125x^3 - 27$

9) Factor:  $2x^2 - 5x - 12$

10) Factor:  $k^4 - 4k^2 + 8k^3 - 32k + 12k^2 - 48$