Date: Section:

Objective:

Review
Name 3 ways to find zeros.   How do you determine the end behavior?

Steps for finding the multiplicities
1. The number of times a given factor appears in the factored form of the equation of a polynomial is called the multiplicity.

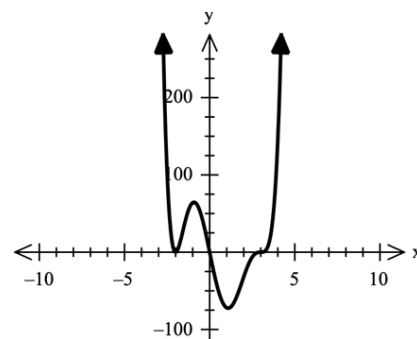Example: $y = 3(x + 5)^3(x + 2)^4(x - 1)^2(x - 5)$

Steps for finding if the graph touches or crosses
1. If the multiplicity is even, the graph touches and bounces off the x-axis.

2. If the multiplicity is odd, the graph crosses the x-axis.

Example: List the zeros to the polynomial. Zeros: _____

What is happening at each of the zeros?

Can you write a *possible* equation for the given graph?
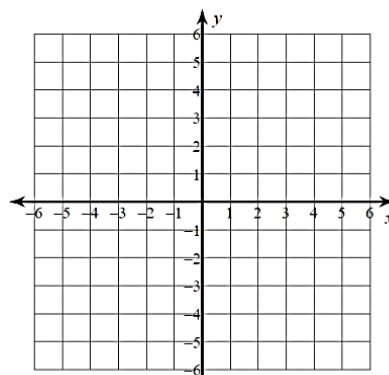

Graph each function <u>without</u> a calculator. Start by factoring to find the zeros. Then fill out the chart for multiplicity and determine whether each zero touches or crosses the x-axis. Find the end behavior. Finally sketch the graph (don't worry about the height of the maximums and minimums).

1. $f(x) = (x+1)^4 (x-5)^3$

Zero	Multiplicity	Touch/Cross

$\lim_{x \to -\infty} f(x) =$

$\lim_{x \to +\infty} f(x) =$

2. $f(x) = -(x-4)^2 (x+1)^3 (x+3)$

Zero	Multiplicity	Touch/Cross

$\lim_{x \to -\infty} f(x) =$

$\lim_{x \to +\infty} f(x) =$
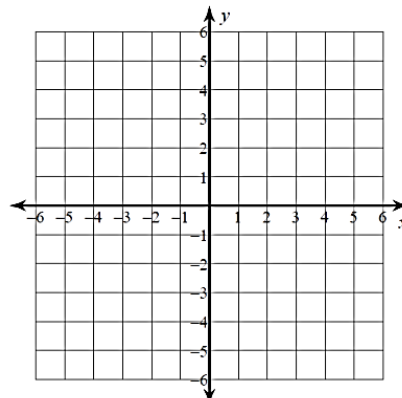
3. $f(x) = x^2 + x - 12$

Zero	Multiplicity	Touch/Cross

$\lim\limits_{x \to -\infty} f(x) =$

$\lim\limits_{x \to +\infty} f(x) =$
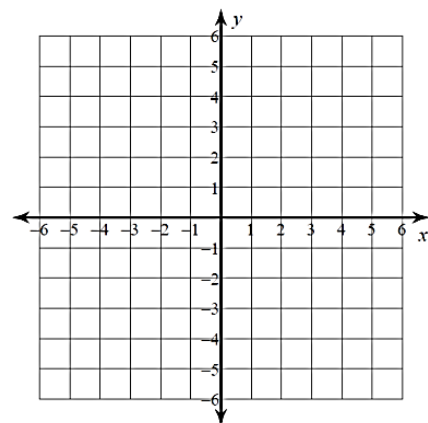
4. $f(x) = x^3 - 16x$

Zero	Multiplicity	Touch/Cross

$\lim\limits_{x \to -\infty} f(x) =$

$\lim\limits_{x \to +\infty} f(x) =$
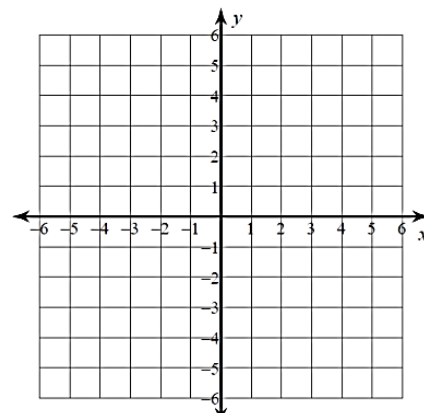
5. $f(x) = -2x^4 + 50x^2$

Zero	Multiplicity	Touch/Cross

$\lim\limits_{x \to -\infty} f(x) =$

$\lim\limits_{x \to +\infty} f(x) =$
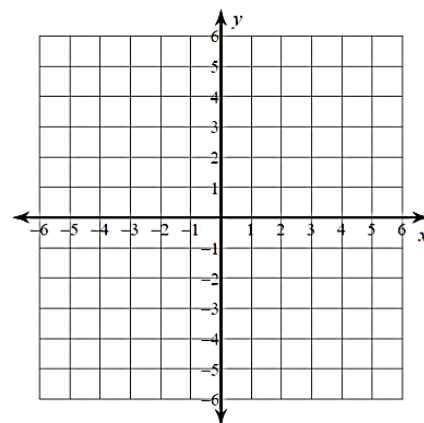
EXAMPLE: Given the graph, write the equation using the lowest exponents possible.

1. Equation in factored form: _____

   Equation in standard form: _____