Intro to Graphing Polynomials Worksheet

Do your work on another sheet of paper. This is a hw assignment and will be checked.

Chapter 4 is about working with higher order polynomials. In Ch 3, we studied quadratics (degree 2). In Ch 4, we will study **cubics** (degree 3), **quartics** (degree 4) and maybe a **quinitic** (degree 5) or two. This sheet will only deal with the basics of graphing these types of functions. The key factors to graphing polynomials is to notice and use the following facts:

- **degree** (highest power present)
- sign of the **leading coefficient** (coefficient on the highest powered term)
- the location of the **roots** (x intercepts)
- the type of roots (real or complex, single, double or triple roots)

1. Use a $-10 \le x \le 10$ and $-20 \le y \le 20$ window for all the graphs
   a) Graph $y = 2x^3 - 3x^2 - 4$ and $y = 2x^3 - 11x + 5$ with your calculator on the same axis. Copy the graph onto your hw page
   b) Graph $y = -2x^3 + 5x^2 - 7$ and $y = -3x^3 - 3x^2 + 4x + 3$ with your calculator on the same axis. Copy the graph onto your hw page
   c) What do all cubics seem to have in common? How is the first two (part a) different than the last two (part b)? Why do you think this is?

2. Use a $-10 \le x \le 10$ and $-20 \le y \le 20$ window for all the graphs
   a) Graph $y = 2x^4 - 5x^2 - 2x + 5$ and $y = x^4 - 4x^3 + 2x + 1$ with your calculator on the same axis. Copy the graph onto your hw page
   d) Graph $y = -5x^4 - 8x^3 + 4x + 12$ and $y = -2x^4 + 5x^2 + x - 1$ with your calculator on the same axis. Copy the graph onto your hw page
   e) What do all quartics seem to have in common? How is the first two (part a) different than the last two (part b)? Why do you think this is?

As you have just seen, the degree and leading coefficient determines the general shape of the graph. We will now look at the role of the roots in the graph.

3. a) Find the x – intercepts of $y = (x-4)(x+2)(x-7)$ by solving $(x-4)(x+2)(x-7) = 0$.
   b) To find where the graph will be above the y axis, solve $(x-4)(x+2)(x-7) > 0$. (look at p. 122 for a refresher on how to do this)
   c) Keeping in mind that this is a "positive cubic" graph $y = (x-4)(x+2)(x-7)$ by hand. What is important is the general shape and not the exact location of the maxs and mins. You can check it with your calculator.

4. . a) Find the $x-$ intercepts of $y=-\frac{1}{4}(x+1)(x-4)(x-7)(x+5)$ by solving

$-\frac{1}{4}(x+1)(x-4)(x-7)(x+5)\ (x-4)(x+2)(x-7)=0.$

c) To find where the graph will be above the y axis, solve

$-\frac{1}{4}(x+1)(x-4)(x-7)(x+5)>0$

c) Keeping in mind that this is a "negative quartic" graph $y=(x-4)(x+2)(x-7)$ by hand. What is important is the general shape and not the exact location of the maxs and mins. You can check it with your calculator.