12th Calculus – Summer Packet

Hi Rising Seniors,

Here is what passes for a Summer Math Packet for you, assuming you're going to take Calculus in the Fall. In Calculus, we study the behavior of functions, and that means graphing. You shouldn't enter Calculus if you don't know the basic graphs by heart. The first part of this packet reviews the basic graphs. The second part reviews the graphing techniques you learned in PreCalc.

Part I: You should be able to look at a function of the form $y = x^r$ and know immediately what its graph looks like, depending on what sort of number r is. For each situation below, describe the shape of the graph and provide a couple examples. I suggest you try a few examples on your graphing calculator or Wolfram Alpha, until you know what the oddness/evenness/positiveness/negativeness of each number does to the graph. Then write a couple sentences describing this and give a couple examples.

1. r is an odd positive integer.

2. r is an even positive integer.

3. r is an odd negative integer.

4. r is an even negative integer.

5. $r = \frac{p}{q}$ in lowest terms. r is positive. p and q are both odd.

7. $r = \frac{p}{q}$ in lowest terms. r is positive. p is even and q is odd.

8. $r = \frac{p}{q}$ in lowest terms. r is positive. p is odd and q is even.

9. 6. $r = \frac{p}{q}$ in lowest terms. r is negative. p and q are both odd.

10. $r = \frac{p}{q}$ in lowest terms. r is negative. p is even and q is odd.

11. $r = \frac{p}{q}$ in lowest terms. r is negative. p is odd and q is even.

Part II: This part is about graphing rational functions. These graphs are built on simple graphs from Part I. Section 2.7 of the PreCalc text is the summary section of graphing these types of functions. You may ignore the topic of "slant asymptotes." For the problems listed, find the x and y-intercepts and vertical and horizontal asymptotes. Then sketch a nice graph of the function. Resist using technology until you think you have a good graph.

Section	Exercises
2.7	9–33 odd 59, 60, 62
2.R	125–133 odd

My way of rewarding your hard work is to give you bonus points for well–completed packets. You can use these points later to enhance quiz or test scores as you please.

You are welcome to e-mail me math questions during the Summer. See you in the Fall.

DrG