Discussion Problems for Math 180

Thursday, January 29, 2015

Review

1. What are the domains and ranges of the following functions?
   (a) $f(x) = 2\sin(x)$
   (b) $g(x) = \sin(x) + 1$
   (c) $h(x) = \tan(x)$
2. Complete the square:
   (a) $x^2 + 4x - 3$
   (b) $2x^2 - 8x + 5$
   (c) $1 - 3x - 4x^2$
3. What is $1 + 2 + 3 + 4 + \cdots + 2000$?

This time

4. Sketch the graph of a continuous function $y(t)$ with domain $(-1, \infty)$ such that
$$y(0) = 2, \quad y(2) = 0, \quad \text{and} \quad \lim_{t\to\infty} y(t) = 1.$$
5. Write down an expression for a continuous function $z(x)$ with domain $(-\infty, 1) \cup (1, \infty)$ such that
$$\lim_{x\to 1^-} z(x) = \infty, \quad \lim_{x\to 1^+} z(x) = -\infty, \quad \text{and} \quad \lim_{x\to\infty} z(x) = -1.$$
6. What is $\lim_{x\to\infty} \dfrac{x^2 - 1}{3x^2 + x + 7}$?
7. What is $\lim_{x\to 0} \dfrac{2x^2 + 8x}{3x^3 - 2x}$?
8. What is the end behavior of the function $\dfrac{\sqrt{x^2 + 1}}{x}$?
9. What is the end behavior of the function $x\sin\left(\dfrac{1}{x}\right)$?