Name:_____

Math 2250 Exam #1
September 9, 2011

Instructions: You are welcome to use one sheet of notes, but no other references or tools are allowed (no textbooks, no calculators, etc.). This is a 50 minute exam; you may start working at 1:25 PM and must stop at 2:15 PM. To receive full credit for a correct answer you must demonstrate how you arrived at that answer. To receive partial credit for an incorrect answer your work must be clearly explained.

1. (4 points) What is the average rate of change of the function $v(t) = \csc(t)$ over the interval $[\pi/6, \pi/2]$?

2. (5 points) Determine either of the horizontal asymptotes to the curve

$$y = \frac{3x - \frac{5}{2}}{\sqrt{4x^2 + 6x - 9}}.$$

3. (9 points) Let

$$f(x) = 2\frac{x-1}{\sqrt{x^2-1}}.$$

For each of the following, either evaluate the limit or explain why it doesn't exist.

(a)

$$\lim_{x \to 1^+} f(x)$$

(b)

$$\lim_{x \to 1^-} f(x)$$

(c)

$$\lim_{x \to -1^-} f(x)$$

4. (5 points) Find the equation of the tangent line to the curve $y = \sqrt{x}$ at the point $(4, 2)$.

5. (5 points) Define $g(2)$ in a way that extends the function

$$g(x) = \sin\left(\frac{x^2 - 4x + 4}{x - 2}\right)$$

to be continuous at $x = 2$.