Lecture time: 1 pm **Quiz 5** Quiz time limit: 20 min.

Spring 2015 **Your name:** _____

Math 0220 **Your TA's name:** _____

No calculators, no notes, no books are permitted. L'Hospital's rule is not allowed.

SHOW ALL WORK (no work = no credit). Write neatly. Simplify your answers.

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1. Find the limit, if it exists. If the limit does not exist explain why. You may use the L'Hospital's Rule.

(a) [2 points] $\lim_{\theta \to \frac{\pi}{2}} \dfrac{1+\cos 2\theta}{1-\sin\theta}$

(b) [3 points] $\lim_{x \to 1^+} x^{\frac{x}{1-x}}$

2. [5 points] For the function $f(x) = x^2 - 5x + 2\ln x$

(a) Find intervals on which f is increasing or decreasing.

(b) Find numbers x at which f attains local maximums and minimums.

(c) Find intervals of concavity and the inflection points.

bonus problem [5 points extra] Suppose that $f(0) = -3$ and $f'(x) \leq 5$ for all x. How large can $f(2)$ possibly be?