Math 1450, Honor Calculus Practice5, Fall 2016.

September 28, 2016

PSID: _____ Name: _____

1. A number a is called a fixed point of a function f if $f(a) = a$. Prove that if $f'(x) \neq 1$ for all real numbers x, then f has at most one fixed point.

2. Use the Mean Value Theorem to prove the inequality

$$|\sin a - \sin b| \leq |a - b| \quad \text{for all } a \text{ and } b.$$

3. Use mathematical induction to prove for all $n \geq 1$

$$1^2 + 2^2 + 3^2 + \cdots + n^2 = \frac{n(n+1)(2n+1)}{6}.$$

4. Use mathematical induction to prove for all $n \geq 1$

$$1 \times 2 + 2 \times 3 + 3 \times 4 + \cdots + n \times (n+1) = \frac{n(n+1)(n+2)}{3}.$$