Math 131a/2 Quiz #2

Printed Name__________________________Signature__________________________

1. Suppose that you are given a partition of $[a, b]$
$P: a = x_0 < x_1 < \ldots < x_n = b$. Define

a) the upper Riemann sum $U_P(f)$

$$U_P(f) = \sum_{i=1}^{n} M_i (x_i - x_{i-1}) \qquad M_i = \sup \{f(x) : x_{i-1} \le x \le x_i\}$$

b) the lower Riemann sum $L_P(f)$.

$$L_P(f) = \sum_{i=1}^{n} m_i (x_i - x_{i-1}) \qquad m_i = \inf \{f(x) : x_{i-1} \le x \le x_i\}$$

c) the Riemann sum $S(f)$ determined by points $x_i^* \in [x_{i-1}, x_i]$

$$S(f) = \sum_{i=1}^{n} f(x_i^*)(x_i - x_{i-1})$$

2. a) Suppose that f is defined on $[a, b]$ and $c \in (a, b)$. Define: f is differentiable at c.

$$f'(c) = \lim_{\substack{x \to c \\ x \neq c}} \frac{f(x) - f(c)}{x - c} \text{ exists}$$

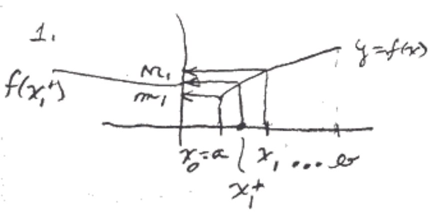
b) Show that if f is differentiable at c then it is continuous at c. (Hint : Express $f(x)$ in terms of difference quotient)

$$f(x) = \frac{f(x) - f(c)}{x - c} \cdot (x - c) + f(c)$$

$$\Rightarrow \quad \lim_{\substack{x \to c \\ x \neq c}} f(x) = f'(c) \cdot 0 + f(c) = f(c)$$

HINTS

1.



2. a)