

Name: \_\_\_\_\_

Score: \_\_\_\_\_

1. Find the points of continuity of the following functions. (1 point each)

(a)  $f(x) = e^x$

(b)  $f(x) = \begin{cases} 1, & x \leq 0 \\ x, & x > 0 \end{cases}$

(c)  $f(x) = \begin{cases} \frac{1}{x-1}, & x \leq 0 \\ \frac{1}{x+1}, & x > 0 \end{cases}$

(d)  $f(x) = \begin{cases} x^2, & x \leq -1 \\ |x|, & -1 < x < 1 \\ \sin x, & x \geq 1 \end{cases}$

2. Using the Intermediate Value Theorem, show that  $x^4 - x - 2 = 0$  has a solution in  $(0, 2)$ . (2 points)

3. Find  $f'(x_0)$  according to the definition of derivative at a point, for each of the following.  
(2 points each)

(a)  $f(x) = x^2 + 1, x_0 = -1$

(b)  $f(x) = \sqrt{x}, x_0 = 4$