

Name: _____

Quiz 11, section 4.1

1. (3 pts) Find the critical points of
- $f(x) = x^3 - 3x^2 - 9x + 174$

$$\begin{aligned} f'(x) &= 3x^2 - 6x - 9 = 3(x^2 - 2x - 3) \\ &= 3(x-3)(x+1) \end{aligned}$$

$$\text{CP } x = 3, -1 \quad (\text{where } f'(x) = 0)$$

2. (5 pts) Find the absolute maximum and minimum of
- $f(x) = xe^{-x}$
- on the interval
- $[0, 2]$

$$f'(x) = e^{-x} - xe^{-x} = (1-x)e^{-x} = 0 \quad \text{at } x=1$$

candidates

$x=0$	$f(0) = 0$	← abs min
$x=1$	$f(1) = e^{-1} \approx .37$	← abs max
$x=2$	$f(2) = 2e^{-2} \approx .27$	

3. (2 pts) Sketch the graph of a continuous function on the interval
- $[1, 5]$
- that has its absolute maximum at
- $x=3$
- , its absolute minimum at
- $x=1$
- and a local minimum at
- $x=4$
- .

