Math 118 Practice 2nd Midterm

1. What are the maximum and minimum values of the function $f(x) = x^3 - 3x + 1$ on the interval $[0, 3]$, and where do they occur?

2. Use linear approximation to estimate $\ln(0.9)$.

3. Find an equation for the line tangent to the graph of $xy + y^2 = 4$ at the point (3,1).

4. Given: $r(2) = 4$, $s(2) = 1$, $s(4) = 2$, $r'(2) = -1$, $s'(2) = 3$, $s'(4) = 3$. Compute the following derivatives, or state what additional information you would need to be able to do so.

(a) $H'(2)$ if $H(x) = r(x) \cdot s(x)$

(b) $H'(2)$ if $H(x) = \sqrt{r(x)}$

(c) $H'(2)$ if $H(x) = r(s(x))$

(d) $H'(2)$ if $H(x) = s(r(x))$

5. Jungle Jane sells robotic monkeys over the internet. To sell q robomonkeys per month, she needs to set the price at $p = 125 - \frac{q}{25}$ dollars per robomonkey. If she has fixed costs of \$10,000 per month, and each robomonkey costs her \$25 to make, how many robomonkeys should she make each month to maximize her profit?