

Quiz

Directions: Carefully read each question below and answer to the best of your ability in the space provided. You **MUST** show your work to receive full credit!

1. (5 points) Find the derivative of the following function:

$$f(x) = \ln(4x^3 + 9x - 7)$$

Solution: Notice that we have a function $4x^3 + 9x - 7$ sitting inside the function $\ln(x)$, thus we need to use chain rule to take the derivative of $f(x)$. So we have

$$f'(x) = \frac{1}{4x^3 + 9x - 7}(12x^2 + 9) = \frac{12x^2 + 9}{4x^3 + 9x - 7}.$$

2. (5 points) Suppose \$6,000 is invested at an annual interest rate of 6% compounded continuously. How long will it take for the original investment to double in value (i.e. \$12,000)?

Solution: Letting $A(t)$ be the function for the value of the investment after t years, since the interest is compounded continuously, the function $A(t)$ is given by

$$A(t) = Pe^{rt},$$

where P is the principal (initial) amount invested, so $P = 6,000$.

Thus, from the problem, we have that

$$12,000 = 6,000e^{0.06t}$$

$$2 = e^{0.06t}$$

$$\ln(2) = 0.06t$$

$$t = \frac{\ln(2)}{0.06}$$

$$\approx 11.55 \text{ years.}$$

Name: _____

Section (circle one): 021 022 023 024

Question:	1	2	Total
Points:	5	5	10
Score:			