

Each problem is worth 0 points... this time...

1. Show why the derivative of $\ln x$ is what it is.
(Research first if you need, but run your attempt by Jon for feedback!)

2. Let $f(x) = x \ln x - x$. Find $f'(x)$ in the most simplified form you can manage.

3. Let $f(x) = \ln(x + \sqrt{9 + x^2})$. Find $f'(x)$ in the most simplified form you can manage.

4. Let $f(x) = \ln(\sin x)$. Find $f'(x)$ in the most simplified form you can manage.

5. Find a function of the form $f(x) = Ab^x$ passing through the points $(1, 20)$ and $(2, 25)$.

6. (a) Find a function of the form $f(x) = Ab^x$ passing through the points $(0, 361)$ and $(10, 439)$.
(b) Use your function from part (a) to find $f(20)$. Compare your result with the data in #6 of §3.4.

7. [Stewart] A sample of tritium-3 decayed to 94.5% of its original amount after a year.
(a) What is the half-life of tritium-3?
(b) How long would it take the sample to decay to 20% of its original amount?

8. [Stewart] A freshly brewed cup of coffee has temperature 95°C in a 20°C room. When its temperature is 70°C , it is cooling at a rate of 1°C per minute. When does this occur?