



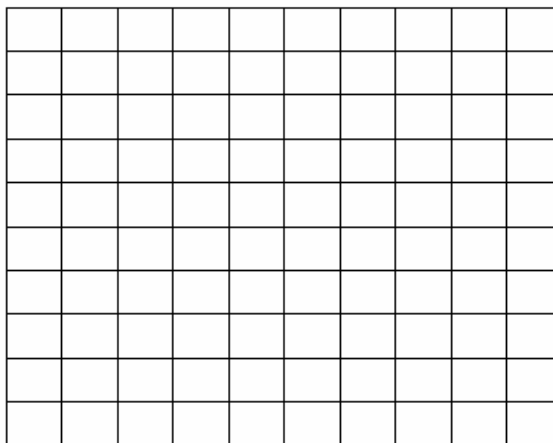
Math 181
Chapter 3 Quiz

Full Name _____
Full Name _____
Full Name _____
Row No. _____ Date _____

All questions worth 10 points except where noted.
No work = No credit. Scrap work not accepted.

1. Solve the equation $\ln(x) + \ln(x-1) = 1$ for x and be sure to check your answer.

2. Sketch the function $f(x) = e^{-x} + 3$ (be sure to label your graph and show work)



3. Find the inverse of $f(x) = 3e^{-x} + 2$ and state its domain and range.

4. The bacteria E-coli has a doubling time of 18 minutes. There are initially 6 cells on the counter at 8pm and you leave them overnight because you don't feel like cleaning.

a) Find the equation for the number of cells at any time

b) How many will be there the next morning, 10 hours later (be careful of units)?

c) It has been shown that as few as 10 cells can make you sick. What time will there be enough cells present to make you sick?

5. Prove that $\cos^{-1}(\cos(x)) = x$ is not always true. Find all values of x when it is true?

6. Find and simplify $\frac{d}{dx} \operatorname{csch} x$ by using the definition of $\operatorname{csch} x = \frac{1}{\sinh x}$

7. Find the derivative (simplification not necessary) and domain for the following functions

a) $f(x) = x \cdot \ln\left(\frac{x-1}{x+1}\right)$

b) $y = \frac{\sin^{-1} 2x}{e^{x+8}}$

c) $g(x) = \exp(\cos x - \sinh x)$

d) $y(x) = \sinh^{-1}(2x - 5x^2) + \ln x$

8. Evaluate the following limits

a) $\lim_{x \rightarrow 0} \frac{1 - e^{-2x}}{\sec x}$

b) $\lim_{x \rightarrow 1} \left(\frac{1}{\ln x} - \frac{1}{x-1} \right)$