Test #2 (Part 2, Calculator Okay) Name: _____

Math 160, Prof. Beydler Thursday, October 25, 2018

Directions: Show all work. No books or notes. A **scientific calculator** is allowed. Your desk and lap must be clear (no phones, no smart watches, etc.). If you have a phone in your lap or on your chair, it is considered cheating, and you will receive a zero on this test. Write your answers in the indicated places, or box your answers. Good luck!

1. Let $f(x) = \frac{x}{x-1}$ and $g(x) = \sqrt{x}$.

a) (1 point) Find $(f \circ f)(2)$.

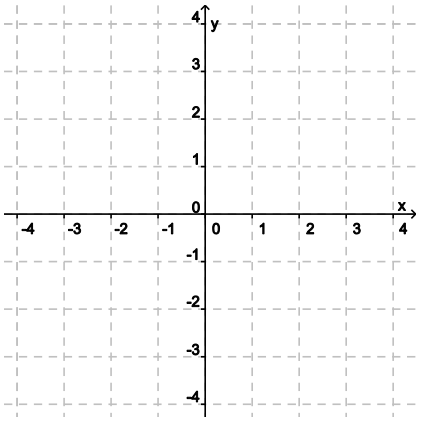
Answer: _____

b) (3 points) Find $f \circ g$ and its domain.

$(f \circ g)(x) =$ _____

Domain of $f \circ g$: _____

2. (5 points) Graph $f(x) = \frac{1}{2}e^{2x} - 1$. State the domain, range, and asymptote. Be sure to describe the transformations to the basic function.

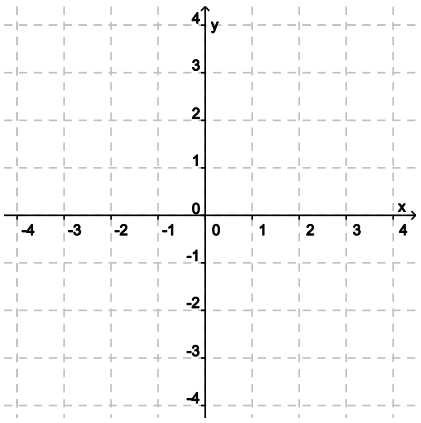


Domain: _____

Range: _____

Asymptote: _____

3. (5 points) Graph $f(x) = -\log_2\left(\frac{x}{2} + 1\right)$. State the domain, range, and asymptote. Be sure to describe the transformations to the basic function.



Domain: _____

Range: _____

Asymptote: _____

4. (3 points) Solve: $5^{2x} - 2 \cdot 5^x - 3 = 0$

Answer: _____

5. (3 points) Solve: $\log_2(2x + 3) = 3 + \log_2(x - 1)$

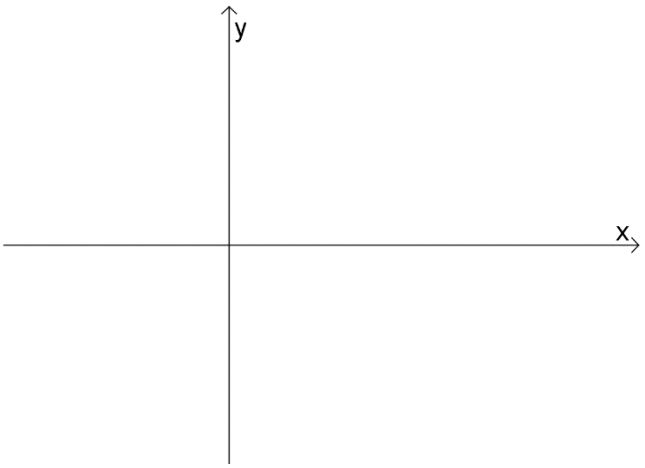
Answer: _____

6. (5 points) A cast iron skillet is $500°F$ when you take it out of the oven. Ten minutes later, the skillet is $400°F$. Suppose the room temperature is $70°F$. First, use Newton's Law of Cooling ($T(t) = T_s + (T_0 - T_s)e^{-kt}$) to find a function that models the temperature of the skillet t minutes after your initial temperature reading. Then, use the function to predict when the skillet will be $200°F$ (round your answer to the nearest minute). While solving, round k to 5 significant figures.

Model $T(t) =$ _____

When skillet will be $200°F$: _____

7. (4 points) Find the amplitude, period, and phase shift of $y = 2 + 2\cos\left(\pi x + \frac{\pi}{2}\right)$ and graph one complete period. Be sure to find the 5 key points.

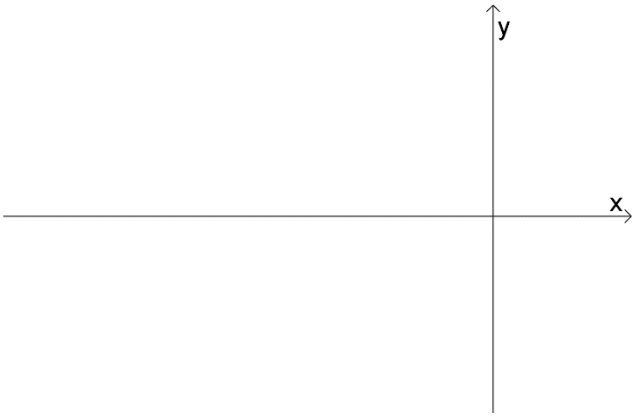


Amplitude: _____

Period: _____

Phase shift: _____

8. (4 points) Find the period and phase shift of $y = \cot\left(\frac{1}{2}x + \pi\right) + 2$ and graph one complete period. Be sure to find the 5 key points/asymptotes.



Period: _____

Phase shift: _____

Note: Be sure to double-check your work. And don't forget to turn in your homework! ☺