

## Week in Review # 3

### Section 1.6, 1.7, and 1.8

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#### Things to know:

- Know how to convert between the different bases of an exponential function.
  - Know the difference between continuous and relative rate of growth/decay.
  - Know how to simplify with logarithms
  - Know how to use logarithms to solve an exponential equation.
  - Understand what the different growth terms mean: half-life, doubling time,...
  - Understand the terms present value and future value of a payment.
  - Know how to shift and scale functions.
  - Know how to compose functions.
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1. Simplify with logarithm rules.

(a)  $\ln(x^4 z^5)$

(b)  $\ln\left(\frac{e^{3x}}{x^5}\right)$

2. Solve for x.

(a)  $J = 5 * 8^x$

(b)  $8 * 3^x = 2 * 7^x$

3. For each of these formulas

I) Convert them into the form  $y = P_0 a^t$  or  $y = P_0 e^{kt}$

II) Give the relative rate of growth/decay.

III) Give the continuous rate of growth/decay.

(a)  $y = 35(1.25)^t$

(b)  $y = 27e^{-.127t}$

4. When solving for the yearly continuous rate of decay for a substance a student rounded the answer to two decimal places and got the answer of 2%.

(a) If the correct rate of decay was 1.505%, find the half-life of the substance.

(b) If the correct rate of decay was 2.4%, find the half-life of the substance.

(c) How does the half-life of the student's rate of decay compare with the answers in parts (a) and (b).

5. A bank account was started with \$600. Two years later the account had \$850.

(a) What is the continuous interest rate for the account?

(b) How long will it take for the account triple?

6. You have been offered a payment of \$5000 in 4 years and a payment of \$8000 in 7 years. What is the present value of this offer if the interest rate is

(a) 6.25% compounded annually.

(b) 6.25% compounded continuously.

7. For the functions  $f(x) = \sqrt{x+5}$  and  $g(x) = 2x^2 + 3$  find

(a)  $g(f(7)) =$

(b)  $f(g(2)) =$

(c)  $g(3 + g(1)) =$

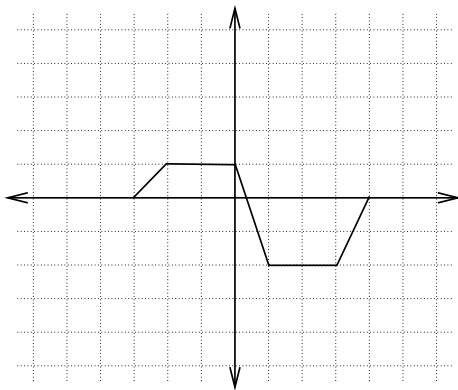
(d)  $f(g(x)) =$

(e)  $g(f(x)) =$

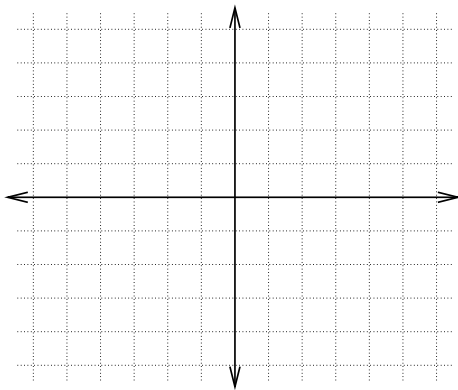
8. Find two function  $f(x)$  and  $g(x)$  such that  $h(x) = f(g(x))$

$$h(x) = 5 \ln(3x^2 + 1)$$

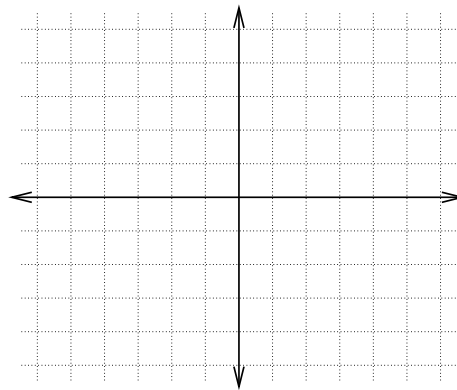
9. The graph of  $f(x)$  is given. Use it to sketch the following.



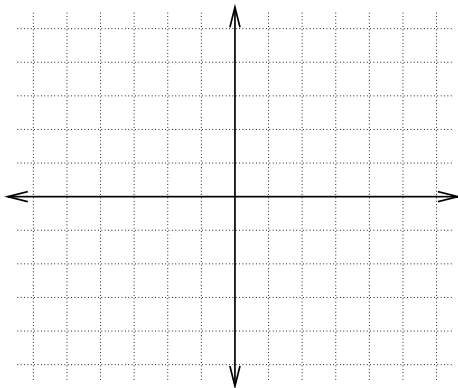
(a)  $f(x+3)$



(b)  $f(x)+2$



(c)  $-2f(x)$



(d)  $2 - f(x)$

