

Sample Exam 2 Problems – Math 107

Note. This is not a template. It is likely that topics that don't appear here will appear on the in-class exam. However, these problems are intended to give you an idea of the style and difficulty level of exam questions, as well as to remind you of some of the major topics we have covered.

- The population of a hopping Midwestern city that starts with 25,000 people in 1980 grows by 20% over a 4-year period.
 - Find a formula for the population of the city as a function t , the number of years after 1980.
 - Find the annual and continuous growth rates of the city. Make it clear which answer is which.
 - In what year does the population of the city reach 40,000?
- Find the half-life of a radioactive substance that decays by 5% annually.
- Simplify each of the following expressions as much as possible, writing your final answer without logarithms IF POSSIBLE.

(a) $e^{2\ln(x+2)}$

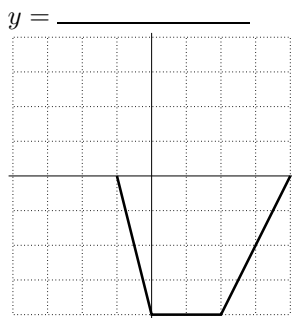
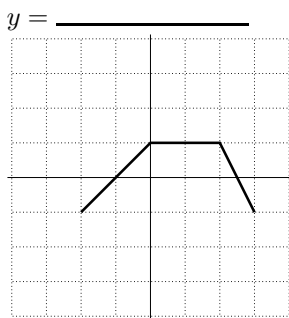
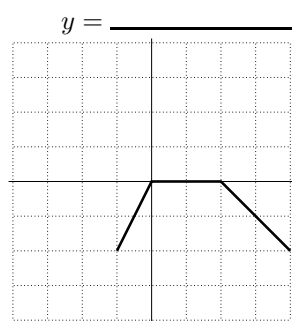
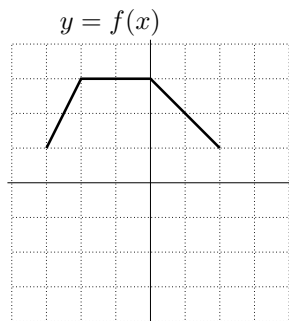
(d) $xe^{\ln x + \ln y}$

(b) $\log(0.01^x)$

(e) $\ln(e^{2x} + e^{2x})$

(c) $\log(\sqrt{10} \cdot 10^x)$

- Below, you are given the graph of a function $y = f(x)$ and three transformations of $f(x)$. Find a formula for each of the three transformations in terms of the function $f(x)$.



- Find **exact values** for each of the following. To simulate a testing situation, try to do these without peeking.

(a) $\sin(7\pi/6)$	(d) $\sec(11\pi/6)$	(g) $\sin \theta$ given that $\cos \theta = 2/3$ and given that θ is in the 4th quadrant.
(b) $\cos(3\pi/4)$	(e) $\cot(\pi/2)$	
(c) $\tan(5\pi/6)$	(f) $\csc(5\pi/4)$	

