

MATH 110 - SECTION 3

Exam #3 - Sample study problems

Very important: These problems do not outline everything that will or will not be on the exam! They should be similar, however the goal of the exam is to test understanding - not regurgitation.

1. Solve $(\ln x)^2 + \ln(x^5) = -4$
2. What is the domain of $f(x) = 2^{x-5}$? What is the domain of $g(x) = \log_2(x - 5)$?
3. Solve $e^{x^3-6x^2+9x} = 1$
4. To the lasting dismay of the Australian authorities, the Arizona cactus is taking over the out-back. Every 11 years the number of cactus double; if there are an estimated 90,000 cactus right now, how many will there be in 20 years? How many years will it take until there are 200,000 cactus (solve with algebra)?
5. A bank is setting up a loan for \$1400. If they are charging 4% and compounding quarterly, how long will they have to wait until to make \$323.50 in interest?
6. Simplify the expression: $\ln\left(\frac{81x^5(z^2 + 100)}{e^{45}x^5}\right)$
7. Consider the functions defined by the tables:

x	f(x)	x	g(x)
-3	-1	-1	8
0	1	0	5
1	0	1	3
2	7	2	2
3	24	6	-2

Use the tables to compute $f^{-1}(g(f(2) - f^{-1}(0)) + g^{-1}(3))$

8. Solve $\frac{1}{2}(e^x - e^{-x}) = 4$. (This is a challenging problem)
9. Simplify the expression $b^{\log_{\frac{1}{b}}(2x) - \log_{\frac{1}{b}}(z^2)}$. (This is a challenging problem)
10. **Note:** Be sure to also review section 3.3 on asymptotes of rational functions, asymptotes of exponential and logarithmic functions, and everything else in sections 3.3 and chapter 4.