

# EXAM 3 - MATH 111

DATE: Friday, March 18

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Read each problem very carefully before starting to solve it. Each question is worth 3 points. It is necessary to show your work. Correct answers without explanations are worth 0 points.

GOOD LUCK!!

1. Use your basic knowledge of exponentials and your graphing techniques to graph the function  $f(x) = -2^{x-3} + 1$ . (Show clearly all transformations and label all points used.) Then find the domain and the range of  $f$ .
2. In the continuous compounding model, the future amount  $A$  of an investment  $P$  that is invested at interest rate  $r$  over a period of  $t$  years is given by the formula  $A = Pe^{rt}$ . Find the time that it takes for an investment with interest rate 5% per year to double, according to this model.
3. Use your basic knowledge of logarithms and graphing techniques to find the domain and roughly sketch the graph of  $f(x) = \log_{1/3}(x + 2)$ . (Show clearly all transformations and label all points used.)
4. Solve the following equations:
  - (a)  $\frac{5x^2}{25^7} = 5^{-5x}$
  - (b)  $\log(x - 1) + \log(x + 2) = 1$
5. A friend of yours deposits \$100 in an account yielding interest quarterly and finds out that at the end of the first year he has \$104 in the account. The bank is closed today and he desperately needs to find out what the bank's stated yearly interest rate is. Help your friend out.
6. Melissa deposits \$2,000 at the end of each semiannual period for 8 years in an account paying 4% compounded semiannually. She then leaves that money alone, with no further deposits, for an additional 5 years. Find the final amount on deposit after the entire 13-year period.

These financial formulas are offered courtesy of George:

1.  $A = Pe^{rt}$
2.  $S = R \frac{(1+i)^n - 1}{i}$
3.  $P = A(1 - rt)$
4.  $A = P(1 + \frac{r}{m})^{mt}$
5.  $S = R \frac{(1+i)^{n+1} - 1}{i} - R$
6.  $A = P(1 + i)^n$
7.  $A = P(1 + rt)$