## EXAM 3 - MATH 111

## DATE: Friday, March 19

**INSTRUCTOR:** George Voutsadakis

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. Let  $f(x) = 3^{x-2} 2$ . Find the x- and the y-intercepts of f, determine its horizontal asymptote and then use the three-point process to roughly sketch its graph.
- 2. Find the domain of the logarithmic function  $f(x) = \log_{2004} \frac{x^2 4}{3x x^2}$ .
- 3. Use the inverse three points process to plot the graph of the logarithmic functions  $f(x) = \log_{\frac{1}{2}} (x+2)$  and  $g(x) = \log_5 (x-1)$  on the same system of axes.
- 4. Solve the logarithmic equations
  - (a)  $\log_2(x-3) = 2 \log_2 x$
  - (b)  $(\log_{2004} z)^2 = \log_{2004} z$
- 5. Find the effective interest rate corresponding to the nominal interest rate of 6% compounded quarterly. If you open an account at a bank offering this nominal rate, in how much time will your original deposit triple?
- 6. Your brother is an incoming freshman next year and, having heard that you took the mathematics of finance with George, comes to you to find out how much money he needs to deposit at the end of every month (with your parents help of course) for the next four years in an account yielding interest rate 4% compounded quarterly so that he be able to buy a new car costing \$12,000 at graduation.

These financial formulas are offered courtesy of  $George^{\mathbb{R}}$  for your perusal:

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