

EXAM 3 - MATH 111

DATE: Monday, November 1

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 $f(x) = \log_{2/5}(\frac{x-1}{2})$. Each of the following three tasks is worth 1 point:

(a) Fill in the missing numbers in the following table:

x	$x - 1$	$\frac{x-1}{2}$	$\log_{2/5}(\frac{x-1}{2})$
		$\frac{2}{5}$	
		1	
		$\frac{5}{2}$	

- (b) Give me the domain $\text{Dom}(f)$ of f .
- (c) Use the table that you filled in in part (a) to make a rough sketch of $y = f(x)$.
2. Consider the three numbers $a = 2004^3$, $b = 2004^{12}$ and $c = 2004^{36}$. Please, compute for me the number $\log_{2004}(\frac{a^6\sqrt{b}}{\sqrt[3]{c}})$.
 3. Solve the exponential equation $\frac{1}{9} \cdot (\frac{1}{3})^{x^2+4} = 3^{5x}$.
 4. Solve the logarithmic equations:
 - (a) $\log(x^{27}) = (\log x)^4$
 - (b) $\log_{1/2}(\log_2(\log_3 x)) = -1$
 5. You graduated from LSSU and wanted to open your own business. Your plan shows that you will need \$30,000 to set up your business. If you plan to take a loan at 12% compounded quarterly and repay the loan after 5 years, find the amount that you will have to repay.

6. Your little brother is now 12 years old. Your dad is very excited that you are learning financial math from George at LSSU and wants to set an annuity for your brother so that he can help him pay for his college tuition at LSSU when he becomes 18 years old. If he is going to deposit some amount of money at the end of each semester in a bank account yielding interest rate 6% compounded semi-annually and the amount that he wants to have for the college tuition of your brother is \$25,000, can you help your dad determine his payment amount?

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. $A = P(1 + rt)$