

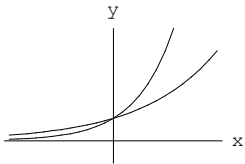
MS 101 Sample Test 1 (5.1-5.4)

Formulas: $A = P(1 + \frac{r}{n})^{nt}$ $A = Pe^{rt}$ $\log_a(x) = y$ is equivalent to $a^y = x$ for $0 < a \neq 1$ and $x > 0$

01. (06 pts) Use a calculator(round to three decimals):

- Evaluate the function $f(x) = 3.2^x$ for $x = 4$.
- Evaluate the function $f(x) = 2(3.2^x)$ for $x = 3$.
- Evaluate the function $f(x) = 2(3.2^{3x})$ for $x = 2$.
- Evaluate the function $f(x) = \log(x)$ for $x = 2$.
- Evaluate the function $f(x) = \ln(x)$ for $x = 2$.
- Evaluate the function $f(x) = \log_5(x)$ for $x = 2$.

02. (04 pts) One of the graphs below is $y = 2^x$ and the other is $y = 5^x$. Label each one.



03. (04 pts) Suppose \$250 is invested at 7% APR for 5 years.

- Find the value of the account if it is compounded monthly. $A = \underline{\hspace{2cm}}$
- Find the value of the account if it is compounded daily. $A = \underline{\hspace{2cm}}$
- Find the value of the account if it is compounded continuously. $A = \underline{\hspace{2cm}}$

04. (06 pts) Suppose the population of cats at the dump can be modeled by $P = 1250e^{0.025t}$ where P is the number of cats and t is the number of years since year 2000.

- How many cats lived at the dump in year 2000?
- How many cats lived at the dump in year 2008?
- Is the the size of the cat population decreasing or increasing?

05. (02 pts each) Write each of the following exponential equations as a logarithmic equation.

a) $2^3 = 8$

b) $4^2 = 16$

c) $e^{-0.446x} = 12$

06. (02 pts each) Write each of the following logarithmic equations as an exponential equation.

a) $\log_5(25) = 2$

b) $-5 = \log_2\left(\frac{1}{32}\right)$

c) $\log(5x) = 0.1234$

07. (04 pts) The expression $\log\left(\frac{x^2}{y}\right)$ is equivalent to which one of the following expressions:

a) $\frac{2\log(x)}{\log(y)}$ b) $\frac{\log(x^2)}{y}$ c) $\log(x) + \log(x) - \log(y)$ d) $\log(2x) - \log(y)$

08. (04 pts) The expression $\log(5) - \log(y) + \log(z)$ is equivalent to which one of the following expressions:

a) $\log\left(\frac{5}{y}z\right)$ b) $\log\left(\frac{5-y}{z}\right)$ c) $\log\left(\frac{5}{y} + z\right)$ d) $\log(5 - y + z)$

09. (04 pts) Use the Change of Base Formula to find $\log_6(37) =$

10. (04 pts) TRUE or FALSE: For all $u > 0$ and $v > 0$, $\log(u + v) = \log(u) + \log(v)$

11. (04 pts) TRUE or FALSE: For all $u > 0$ and $v > 0$, $\log(uv) = \log(u)\log(v)$

12. (04 pts) Find the exact value of the logarithm $\log_5(125)$ without your calculator:

08. (04 pts each) Solve the following equations for the variable. Please express the final answer as a decimal rounded to 3 decimal places.

a) $3 \ln(2x) = 9$ $x = \underline{\hspace{2cm}}$ b) $5 + 2 \ln(x) = 15$ $x = \underline{\hspace{2cm}}$

c) $e^{3x} = 9$ $x = \underline{\hspace{2cm}}$ d) $4e^{2x} = 12$ $x = \underline{\hspace{2cm}}$