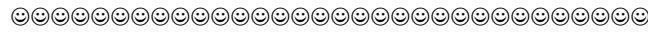


**College Algebra**  
**Math1043 Exam III-warmup**

**Section 4.1:** Know what an exponential function is and know how the graphs of such function look like. Know the properties of these functions (as discussed in class), such as asymptote(s), domain, range,  $x$ -intercept,  $y$ -intercept, etc. Be able to sketch the graphs of exponential functions and their variations.

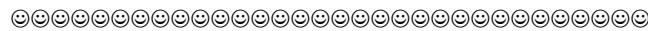
Know what the natural exponential function is and know its properties. Know how work out problems about compound interest and continuous interest and also problems regarding exponential growth and radioactive decay.

**Look at the assigned problems from this section**



**Section 4.2:** Be able to use your calculator to solve problems on the application of exponential functions, problems in the areas of population growth, radioactive decay, bacterial growth, and other problems involving exponential functions.

**Look at: The problems assigned as homework.**



**Section 4.3:** Know the definition of logarithm and be able to convert from exponential to logarithm and vice versa. Know the logarithmic function, its graph, its domain, range and its relationship with exponential function.

**Look at: The problems assigned as homework.**



## Here are some more problems covering the above topics

1. Given the exponential decay function  $g(t) = 40 e^{-0.2t}$ , evaluate  $g(3)$  accurate to the third decimal place.
2. Suppose that \$2,000 is deposited in a savings account with an annual interest rate of 11% . Calculate the amount of money in the account at the end of 5 years if the interest is compounded quarterly (4 times per year).
3. Suppose that a principal of \$3500 is deposited in a savings account whose annual rate of interest is 9%. Calculate the future value of this principal in 18 years if interest is compounded continuously.
4. Certain bacteria population increases according to the model  $P(t) = 250 e^{0.47t}$ , where  $t$  is the # of days from the initial day of the experiment. Use the model to determine the population when 10 days later.
5. If  $\log_8 N = \frac{2}{3}$ , then find  $N$
6. If  $f(x) = \log_3 x$ , then find  $f^{-1}(x)$ .
7. Write the logarithmic form of the equality  $4^3 = 64$  :
8. If  $a > 1$ , then sketch the graph of  $y = a^x$ .
9. Find the domain of  $f(x) = \log(x+2)$

10. Write all properties of the logarithmic function  $f(x) = \log_5 x$

11. Write all properties of the exponential function

12. Find the vertical asymptote of  $f(x) = \ln(x - 3)$ .

13. Evaluate  $\frac{7 \log 12}{\log 7 + \log 3}$

14. The amount remaining of the radio active isotope Radium-226 after  $t$  years is given by  $A(t) = 50e^{-0.00043t}$ . Find

a) The initial quantity of  $\text{Ra}^{226}$ ?

b) How much radio active substance remains after 500 years?

15. In 1997 the population of the United States of America was 268 million people and it is estimated that the population will double in 47 years. Determine the population of the United States of America in year 2067.

1. Write  $\log_2(x+1) = 7$  in exponential form

2. Write  $5\sqrt{x} = 3$  in logarithmic form.

3. Find the following :

i.  $\log_x 1$

ii. The domain of  $f(x) = \log_{10}(3x+1)$

iii. The inverse  $f^{-1}(x)$  of function  $f(x) = \log_2 x$

iv.  $\log_x z$

v. The inverse  $g^{-1}(x)$  of function  $f(x) = 5^x$

4. The population of a town increases according to the model:  $P(t) = 2500e^{0.0293t}$ , where  $t$  is time in years, with  $t = 0$  corresponding to 1985. Use the model to find the population of the town in year 2000. What was the population in year 1985?

5. Sketch the graph of  $g(x) = 2^{x-3} + 1$ , and label any asymptotes or intercepts.

6. Consider the function  $g(x) = \log_2(x - 2)$ .

a) Find the domain of  $g(x)$ .

b) Sketch the graph of  $g(x)$ , and label any asymptotes or intercepts.

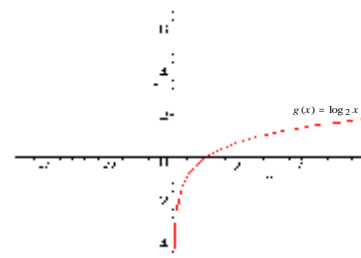
c) Label one additional point.

. In 1997 the population of a country was 67.5 million people and the annual growth rate was 2.12%. Assuming this growth rate remains constant, what will be the population of that country in 2020?

8. Solve the following equations for  $x$ :  $2^{x+3} = 4^x$

9. Use the graph of  $g(x) = \log_2 x$  below to sketch the graph of  $f(x) = 1 + \log_2 x$ .

Label the intercept(s) and asymptote. i) Complete the given table



$x$	1	2	3	4
$f(x)$				

ii) Domain  $f(x)$ ,iii) Range  $f(x)$ 

10. Solve  $2^{x+3} = 16$  for  $x$ .

11. Which of the following is not exponential function?

a)  $f(x) = 2 \cdot 3^x$

b)  $f(x) = \left(\frac{2}{3}\right)^x$

c)  $f(x) = 50 \cdot x^{\frac{3}{2}}$

d)  $f(x) = 8^{-x}$

