

## Sample Questions to the Final Exam in Math 1111—Chapter 5

### Section 5.1

1. \$1500 is invested at an annual rate of 8% compounded quarterly. What is the balance after 5 years?

$$B = p \left( 1 + \frac{r}{n} \right)^{nt}$$

- a. \$1624.67    b. \$2237.74    c. \$2228.92    d. \$2226.04    e. None of these

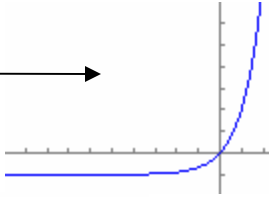
2. Determine the amount of money that should be invested at an annual rate of 8% compounded quarterly

to produce a final balance of \$20,000 in 10 years.  $B = p \left( 1 + \frac{r}{n} \right)^{nt}$

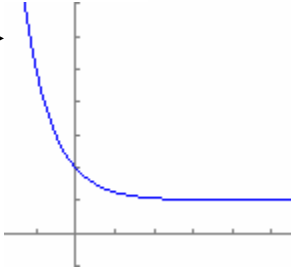
- a. \$16,406.97    b. \$9057.81    c. \$18,463.80    d. \$9081.26    e. None of these

3. \$3500 is invested at a rate of  $4\frac{1}{2}\%$  compounded continuously. What is the balance at the end of 10 years?  $B = Pe^{rt}$

- a. \$315,059.96    b. \$5472.45    c. \$5221.39    d. \$5489.09    e. None of these

4. Match the graph with the correct function. 

- a.  $y = 3^{x-1}$     b.  $y = 3^x - 1$     c.  $y = 3^{1-x}$     d.  $y = 3^{-x} - 1$     e. None of these

5. Match the graph with the correct function. 

- a.  $4^x + 1$     b.  $4^x + 2$     c.  $4^{-x} + 1$     d.  $4^{-x} + 2$     e. None of these

### Section 5.2

1. Evaluate:  $\log_a \left( \frac{1}{a} \right)$ .

- a. 1    b. -1    c. a    d.  $\frac{1}{a}$     e. None of these

2. Write in logarithmic form:  $4^3 = 64$ .

- a.  $4 \log 3 = 64$     b.  $\log_4 64 = 3$     c.  $\log_3 4 = 64$     d.  $\log_3 64 = 4$     e. None of these

3. Write in exponential form:  $\log_b 7 = 13$ .

- a.  $7^{13} = b$     b.  $b^{13} = 7$     c.  $b^7 = 13$     d.  $7^b = 13$     e. None of these

4. Find the domain of the function:  $f(x) = 3 \log(5x - 2)$ .

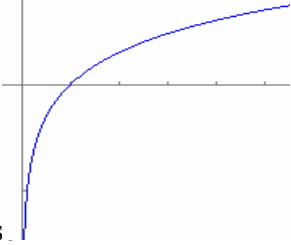
- a.  $(-\infty, \infty)$     b.  $(0, \infty)$     c.  $\left( \frac{2}{5}, \infty \right)$     d.  $(.064, \infty)$     e. None of these

5. What is the vertical asymptote for  $f(x) = \log_2 x$ ?

- a.  $x=2$     b.  $x=0$     c.  $y=0$     d.  $y=2$     e. None of these

6. What is the horizontal asymptote for  $f(x) = 2^x$ ?

- a.  $x=2$     b.  $x=0$     c.  $y=0$     d.  $y=2$     e. None of these

7. Match the graph with the correct function. 

- a.  $f(x) = 3^x$     b.  $f(x) = \log_3 x$     c.  $f(x) = 3^{-x}$     d.  $f(x) = 3 \log x$     e. None of these

8. What is  $f^{-1}(x)$ , if  $f(x) = 4^x$ ?

- a.  $f^{-1}(x) = \frac{1}{4^x}$     b.  $f^{-1}(x) = \log_4 x$     c.  $f^{-1}(x) = 4^{-x}$     d.  $f^{-1}(x) = \log_x 4$     e. None of these

### Section 5.3

1. Identify the expression that is equivalent to  $\log_2 7$ .

- a.  $\frac{\log 2}{\log 7}$     b.  $\frac{\ln 2}{\ln 7}$     c.  $\frac{\ln 7}{\ln 2}$     d.  $\log 7 - \log 2$     e. None of these

2. Evaluate  $\log_4 7$  to 4 decimal places.  
 a. .2430    b. .5596    c. .7124    d. 1.4037    e. None of these
3. Which of the choices below is equivalent to  $\log_b \left( \frac{x^3 y^2}{\sqrt{w}} \right)$ ?  
 a.  $x^3 + y^3 - \sqrt{w}$     b.  $\frac{1}{3} \log_b x + \frac{1}{2} \log_b y - 2 \log_b w$     c.  $3 \log_b x + 2 \log_b y - \frac{1}{2} \log_b w$     d.  $\frac{3 \log_b x + 2 \log_b y}{\frac{1}{2} \log_b w}$     e. None of these
4. Write as a logarithm of a single quantity:  $\frac{1}{4} \log_b 16 - 2 \log_b 5 + \log_b 7$ .  
 a.  $\frac{14}{25}$     b.  $\log_b \frac{2}{175}$     c. 1    d.  $\log_b \frac{14}{25}$     e. None of these
5. Evaluate  $\log_a 24$ , given that  $\log_a 2 = 0.4307$  and  $\log_a 3 = 0.6826$ .  
 a. 0.8820    b. 1.9747    c. 0.2940    d. 1.1133    e. None of these
6. Simplify:  $\ln \sqrt[4]{e^3 x}$ .  
 a.  $\frac{3}{4} + \frac{1}{4} \ln x$     b.  $\frac{3}{4} + \ln \frac{x}{4}$     c.  $\frac{3e}{4} + \frac{1}{4} \ln x$     d.  $\frac{3e}{4} + \frac{1}{4} \ln \frac{x}{4}$     e. None of these
7. Simplify:  $\log_2 \left( \frac{1}{16} \right)$ .  
 a. 4    b. -4    c. 8    d.  $\frac{1}{2}$     e. None of these

### Section 5.4

1. Solve for x:  $3^{2x} = 81$ .  
 a. 13.5    b.  $\frac{1}{4}$     c. 4    d. 2    e. None of these
2. Solve for x:  $\ln e^{2x+1} = 9$ .  
 a.  $\frac{-1 + \ln 9}{2}$     b.  $\frac{9}{2 \ln e} - \frac{1}{2}$     c. 23    d. 4    e. None of these
3. Solve for t:  $e^{-0.097t} = 12$ .  
 a. -256.1759    b. -1237.1134    c. 16,778,844.47    d. -2.5886    e. None of these
4. Solve for x:  $\ln(7-x) + \ln(3x+5) = \ln(24x)$ .  
 a.  $\frac{6}{11}$     b.  $\frac{7}{3}$     c.  $\frac{7}{3}, -5$     d.  $\frac{6}{11}, 5$     e. None of these
5. Solve for x:  $\log(7-x) - \log(3x+2) = 1$ .  
 a.  $\frac{19}{31}$     b.  $-\frac{13}{31}$     c.  $-\frac{27}{29}$     d.  $\frac{9}{4}$     e. None of these
6. Find the number of years required for a \$2000 investment to triple at an 8% interest rate compounded continuously.  $B = Pe^{rt}$   
 a. 12.6    b. 13.7    c. 11.2    d. 15.1    e. None of these
7. Solve for x:  $\log_4 x = -1$ .  
 a.  $x = -4$     b.  $x = -1$     c.  $x = -\frac{1}{4}$     d.  $x = \frac{1}{4}$     e. None of these

### Section 5.5

1. Determine the principal that must be invested at an annual rate of 8% compounded quarterly so that the balance in 40 years will be \$200,000.  $B = P \left( 1 + \frac{r}{n} \right)^{nt}$   
 a. \$90,578.10    b. \$47,539.00    c. \$12,416.00    d. \$8414.00    e. None of these
2. An initial deposit of \$3000 is made in a savings account for which the interest is compounded continuously. The balance will double in 7 years. What is the annual rate of interest for this account?  $B = Pe^{rt}$   
 a. 4.3%    b. 6.2%    c. 8.1%    d. 9.9%    e. None of these