

**Precalculus**  
**Chapter 3 Test Review Worksheet Part 1**

**Name:** \_\_\_\_\_

**Date:** \_\_\_\_\_ **Hour:** \_\_\_\_\_

**Show all work on a separate sheet of paper.**

1. Solve for  $x$ . Approximate to 3 decimal places.

a.  $6^x = \frac{1}{216}$

b.  $\log_6 x = -1$

c.  $\ln x = -1.6$

d.  $e^{3x} = 25$

e.  $e^{2x} - 6e^x + 8 = 0$

f.  $45e^{-.5x} = 15$

g.  $4 \ln 3x = 15$

h.  $\ln \sqrt{(x+8)} = 3$

i.  $\ln x - \ln 5 = 4$

j.  $\log_6(x+12) - \log_6 x = \log_6(x+5)$

k.  $\log(-x-4) = 2$

2. You deposit \$9000 in an account that pays 3.5 % interest compounded continuously. How long will it take for the money to triple?

3. The speed of the wind  $S$  (in miles per hour) near the center of a tornado and the distance  $d$  (in miles) the tornado travels are related by the model  $S = 93 \log d + 65$ . On March 18, 1925, a large tornado struck portions of Missouri, Illinois, and Kansas with a wind speed at the center of about 283 miles per hour. Approximate the distance traveled by this tornado.

4. Evaluate the logarithm using the change-of-base formula. Round to three decimal places.

a.  $\log_{12} 200$

b.  $\log_3 .28$

5. Use the properties of logarithms to rewrite and simplify the logarithmic expressions.

a.  $\log_2 \left(\frac{1}{12}\right)$

b.  $\ln(3e^{-4})$

6. Use the properties of logarithms to expand the expression as a sum, difference, and/or constant multiple of logarithms. (Assume all variables are positive.)

a.  $\log 7x^4$

b.  $\log_7 \frac{\sqrt[3]{x}}{14}$

c.  $\ln \left(\frac{y-1}{4}\right)^2, y > 1$

7. Condense the expression to the logarithm of a single quantity.

a.  $\log_6 y - 2 \log_6 z$

b.  $3 \ln x - 2 \ln(x+1)$

c.  $5 \ln(x-2) - \ln(x+2) - 3 \ln x$

8. The time  $t$  (in minutes) for a small plane to climb to an altitude of  $h$  feet is modeled by  $t = 50\log[18000/(18000 - h)]$ , where 18,000 feet is the plane's absolute ceiling.

- a. Determine the domain of the function in the context of the problem.  
 b. Identify any asymptotes.                      c. Find the time for the plane to climb to an altitude of 4000 ft.

9. Students in a learning theory study were given an exam and then retested monthly for 6 months with an equivalent exam. The data obtained in the study were given as ordered pairs  $(t, s)$ , where  $t$  is the time in months after the initial exam and  $s$  is the average score for the class. Use the data to find a logarithmic equation that relates  $t$  and  $s$ .

(1, 84.2), (2, 78.4), (3, 72.1), (4, 68.5), (5, 67.1), (6, 65.3)

10. Evaluate the function. Round your answer to three decimal places.

- a.  $f(x) = 9 \ln x, x = e^{15}$                       b.  $f(x) = 125^{x/5}, x = -2$                       c.  $f(x) = \log_{11}x, x = \frac{1}{121}$

11. Compound Interest: Complete the table to determine the balance  $A$  for  $P$  dollars invested at rate  $r$  for  $t$  years and compounded  $n$  times per year.

a.  $P = \$10500, r = 1.5\%, t = 5$  years

n	A
1	
2	
4	
12	
365	
Continuous	

12. Answer the following question for each transformation from the parent function.

a.  $f(x) = 2^{x-4} + 6$

b.  $f(x) = \log(x + 13) + 18$

Transformation:

Transformation:

Domain:

Range:

Domain:

Range:

y-intercept

Asymptote

x-intercept

Asymptote

13. The half-life of Einsteinium is 8.35 years. If there is currently 40 grams of Einsteinium, how much Einsteinium will remain after 75 years? How much Einsteinium was there 50 years ago?