

Student: \_\_\_\_\_  
Date: \_\_\_\_\_  
Time: \_\_\_\_\_

Instructor: shannon gracey  
Course: MATH 64/Summer 2013  
Book: Blitzer: Introductory & Intermediate  
Algebra for College Students, 4e

Assignment: Chapter 12 Practice

1. The formula  $A = 15.7 e^{0.0414t}$  models the population of a US state, A, in millions, t years after 2000.

- a. What was the population of the state in 2000?
- b. When will the population of the state reach 18.7 million?

a. In 2000, the population of the state was  million.

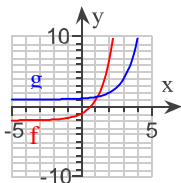
b. The population of the state will reach 18.7 million in the year .  
(Round down to the nearest year.)

ID: 12.4.99

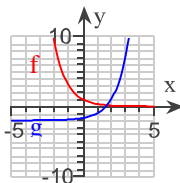
2. Graph the functions  $f(x) = 3^x$  and  $g(x) = 3^{x+1} - 2$  in the same rectangular coordinate system. Select integers  $-2$  to  $2$ , inclusive, for  $x$ . Then describe how the graph of  $g$  is related to the graph of  $f$ . If applicable, use a graphing utility to confirm your hand-drawn graphs.

Choose the correct graphs of  $f$  and  $g$  below.

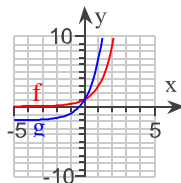
A.



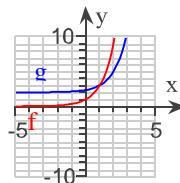
B.



C.



D.



The graph of  $g$  is obtained by shifting the graph of  $f$   unit(s) to the  right and  left

unit(s)  down  up

ID: 12.1.35

3. Evaluate the expression without using a calculator.

$$10^{\log 3}$$

$$10^{\log 3} = \text{}$$

ID: 12.2.57

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4. Solve the following exponential equation by taking the logarithm on both sides. Express the solution set in terms of logarithms. Then use a calculator to obtain a decimal approximation, correct to two decimal places, for the solution.

$$6^x = 7$$

What is the solution in terms of logarithms?

The solution set is  $\{\square\}$ .  
(Type an exact answer in simplified form.)

What is the decimal approximation for the solution?

The solution set is  $\{\square\}$ .  
(Round to two decimal places as needed.)

ID: 12.4.23

5. Solve the equation.

$$\log_6(x + 9) = \log_6 13$$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A. The solution set is  $\{\square\}$ .  
(Type an exact answer in simplified form.)
- B. There is no solution.

ID: 12.4.75

6. Find the domain of the following logarithmic function.

$$f(x) = \log_3(x + 5)$$

The domain of  $f$  is  $\square$ . (Type your answer in interval notation.)

ID: 12.2.47

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7. Use properties of logarithms to expand the logarithmic expression as much as possible. Evaluate logarithmic expressions without using a calculator if possible.

$$\log_b \left( \frac{x^3 y}{z^5} \right)$$

$$\log_b \left( \frac{x^3 y}{z^5} \right) = \square$$

ID: 12.3.27

8. Solve the logarithmic equation. Be sure to reject any value of  $x$  that is not in the domain of the original logarithmic expression.

$$\log_4(x - 4) = -2$$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A. The solution set is  $\{\square\}$ .  
(Type an exact answer in simplified form.)
- B. There is no solution.

ID: 12.4.51

9. Use properties of logarithms to condense the logarithmic expression. Write the expression as a single logarithm whose coefficient is 1. Evaluate logarithmic expressions if possible.

$$6 \ln x - \frac{1}{7} \ln y$$

$$6 \ln x - \frac{1}{7} \ln y = \square$$

ID: 12.3.53

10. Use properties of logarithms to expand the logarithmic expression below as much as possible.

$$\log_g \frac{\sqrt{x} y^3}{z^9}$$

$$\log_g \frac{\sqrt{x} y^3}{z^9} = \square \text{ (Simplify your answer.)}$$

ID: 12.3.33

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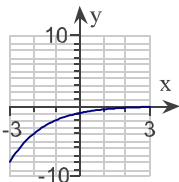
Assignment: Chapter 12 Practice

11. Set up a table of coordinates for the following function. Select integers from  $-2$  to  $2$ , inclusive, for  $x$ . Then use the table of coordinates to match the function with its graph.

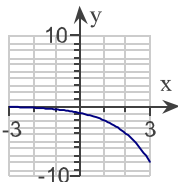
$$f(x) = 2^{-x}$$

Choose the correct graph below.

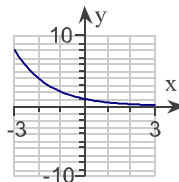
A.



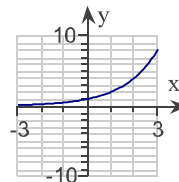
B.



C.



D.



ID: 12.1.15

12. Solve the following logarithmic equation. Be sure to reject any value of  $x$  that is not in the domain of the original logarithmic expression. Give an exact answer. Then use a calculator to obtain the decimal approximation.

$$6 \ln(5x) = 12$$

What is the exact solution? Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

A. The solution set is  $\{\square\}$ .  
(Type an exact answer in terms of  $e$ .)

B. There is no solution.

What is the decimal approximation of the solution? Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

A. The solution set is  $\{\square\}$ .  
(Round to two decimal places as needed.)

B. There is no solution.

ID: 12.4.59

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Assignment: Chapter 12 Practice

13. Write the following equation in its equivalent logarithmic form.

$$14^5 = x$$

The equation in logarithmic form is .

(Type an equation.)

ID: 12.2.15

14. Solve the exponential equation by taking the logarithm on both sides. Express the solution set in terms of logarithms. Then use a calculator to obtain a decimal approximation for the solution.

$$700 e^{1.45x} = 3500$$

What is the solution in terms of logarithms?

- A.  $\left\{ \frac{\ln 5}{1.45} \right\}$                        B.  $\left\{ \frac{\ln 1.45}{5} \right\}$
- C.  $\left\{ \ln \frac{1.45}{5} \right\}$                        D.  $\left\{ \ln \frac{5}{1.45} \right\}$

What is the decimal approximation to the solution?

The solution set is  $\{ \text{} \}$ .

(Type an integer or decimal rounded to two decimal places as needed.)

ID: 12.4.31

15. Use properties of logarithms to condense the logarithmic expression. Write the expression as a single logarithm whose coefficient is 1. Where possible, evaluate logarithmic expressions.

$$\ln x + \ln 15$$

$$\ln x + \ln 15 = \text{$$

ID: 12.3.39

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16. Solve the following exponential equation by expressing each side as a power of the same base and then equating exponents.

$$16^x = \frac{1}{\sqrt{4}}$$

The solution set is  $\{\square\}$ .

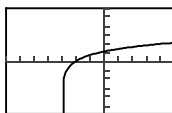
ID: 12.4.17

17. Match the function with its graph.

$$f(x) = \ln(-1-x)$$

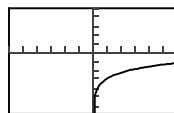
Choose the graph of  $f(x) = \ln(-1-x)$ .

A.



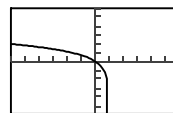
$[-7, 5, 1]$  by  
 $[-6, 6, 1]$

B.



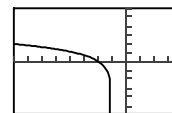
$[-6, 6, 1]$  by  
 $[-7, 5, 1]$

C.



$[-6, 6, 1]$  by  
 $[-6, 6, 1]$

D.



$[-8, 4, 1]$  by  
 $[-6, 6, 1]$

ID: 12.2.85

18. Evaluate the expression without using a calculator.

$$\ln \frac{1}{e^6}$$

$$\ln \frac{1}{e^6} = \square$$

ID: 12.2.63

19. Use properties of logarithms to expand the logarithmic expression below as much as possible. Where possible, evaluate logarithmic expressions without using a calculator.

$$\log(100,000,000x)$$

$$\log(100,000,000x) = \square \text{ (Simplify your answer.)}$$

ID: 12.3.5

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**Assignment:** Chapter 12 Practice

20. Solve the following logarithmic equation. Be sure to reject any value of  $x$  that is not in the domain of the original logarithmic expression. Give the exact answer.

$$\log_2 x = 2$$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A. The solution set is  $\{\square\}$ .  
(Simplify your answer.)
- B. There is no solution.

ID: 12.4.41

21. Evaluate the expression without using a calculator.

$$\log_6 \frac{1}{6}$$

$$\log_6 \frac{1}{6} = \square$$

ID: 12.2.25

22. Evaluate the expression without using a calculator.

$$\log_6(\log_2 64)$$

$$\log_6(\log_2 64) = \square$$

ID: 12.2.79

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Assignment: Chapter 12 Practice

23. Complete the table for a savings account subject to 4 compoundings yearly.

$$\left[ A = P \left( 1 + \frac{r}{n} \right)^{nt} \right]$$

Amounted Invested	Number of Compounding Periods	Annual Interest Rate	Accumulated Amount	Time t in Years
\$15,000	4	5.25%	\$24,000	?

Let A represent the accumulated amount, P the amount invested, n the number of compounding periods, r the annual interest rate, and t the time. Find the time, t.

t =  years

(Do not round until the final answer. Then round to one decimal place as needed.)

ID: 12.4.103

24. Use properties of logarithms to expand the logarithmic expression as much as possible. Evaluate logarithmic expressions without using a calculator if possible.

$$\ln \left( \frac{e^3}{10} \right)$$

$$\ln \left( \frac{e^3}{10} \right) = \text{$$

ID: 12.3.13

25. Solve the logarithmic equation. Be sure to reject any value of x that is not in the domain of the original logarithmic expressions. Give the exact answer.

$$\ln(x - 4) + \ln(x + 1) = \ln(x - 8)$$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

A. The solution set is {  }.  
(Simplify your answer. Use a comma to separate answers as needed.)

B. There is no solution.

ID: 12.4.89



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Assignment: Chapter 12 Practice

26. Solve the following exponential equation by expressing each side as a power of the same base and then equating the exponents.

$$27^x = 243$$

The solution set is  $\{\square\}$ .

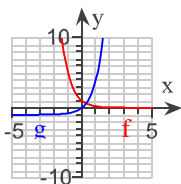
(Type an integer or a fraction. Simplify your answer. Use a comma to separate answers as needed.)

ID: 12.4.11

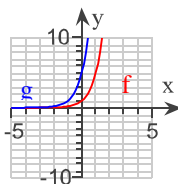
27. Graph the functions  $f(x) = 5^x$  and  $g(x) = 5^{x-1}$  in the same rectangular coordinate system. Select integers  $-2$  to  $2$ , inclusive, for  $x$ . Then describe how the graph of  $g$  is related to the graph of  $f$ . If applicable, use a graphing utility to confirm your hand-drawn graphs.

Choose the correct graphs of  $f$  and  $g$  below.

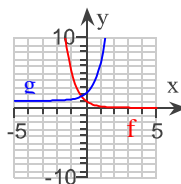
A.



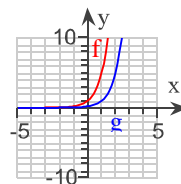
B.



C.



D.



The graph of  $g$  is obtained by shifting the graph of  $f$   $\square$  unit(s)

to the right  
down  
to the left  
up

ID: 12.1.27

28. Use properties of logarithms to expand each logarithmic expression as much as possible. Evaluate logarithmic expressions without using a calculator if possible.

$$\log(P^{-4})$$

$$\log(P^{-4}) = \square$$

ID: 12.3.17

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Assignment: Chapter 12 Practice

29. Let  $\log_b 5 = Y$  and  $\log_b 6 = K$ . Write the expression in terms of Y and/or K.

$$\log_b 36$$

$$\log_b 36 = \square$$

ID: 12.3.71

30. Evaluate the expression without using a calculator.

$$\log_3 3^2$$

$$\log_3 3^2 = \square$$

ID: 12.2.39

31. Evaluate or simplify the expression without using a calculator.

$$e^{\ln 3x^2}$$

$$e^{\ln 3x^2} = \square$$

ID: 12.2.69

32. Use common logarithms or natural logarithms and a calculator to evaluate the following.

$$\log_{13} 88.5$$

$$\log_{13} 88.5 \approx \square$$

(Do not round until the final answer. Then round to four decimal places as needed.)

ID: 12.3.63

33. Solve for x.

$$4^{3x-1} = 16$$

The solution set is  $\{\square\}$ .

ID: 12.4.5

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Time: \_\_\_\_\_

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Assignment: Chapter 12 Practice

34. Write the equation in its equivalent exponential form.

$$4 = \log_9 M$$

What is the equivalent exponential form of the equation?

ID: 12.2.3

35. Solve the logarithmic equation. Be sure to reject any value of  $x$  that is not in the domain of the original logarithmic expressions. Give the exact answer.

$$\log_5(x + 118) + \log_5(x - 6) = 3$$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A. The solution set is  $\{\square\}$ .  
(Simplify your answer. Use a comma to separate answers as needed.)
- B. There is no solution.

ID: 12.4.67

36. Solve the logarithmic equation. Be sure to reject any value of  $x$  that is not in the domain of the original logarithmic expressions.

$$2 \log x = \log 49$$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A. The solution set is  $\{\square\}$ .  
(Type an exact answer in simplified form.)
- B. There is no solution.

ID: 12.4.81

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**Assignment:** Chapter 12 Practice

37. Caladan is currently one of the world's fastest-growing countries. The exponential function  $f(x) = 142(1.034)^x$  models the population of Caladan,  $f(x)$ , in millions,  $x$  years after 1974. Using this exponential function and a calculator with a  $y^x$  key or a  $^$  key, answer the following questions.
- a. Substitute 0 for  $x$  and, without using a calculator, find Caladan's population in 1974.
- million
- b. Substitute 21 for  $x$  and use your calculator to find Caladan's population in the year 1995 as predicted by this function.
- million (Round to the nearest tenth.)
- c. Find Caladan's population in the year 2016 as predicted by this function.
- million (Round to the nearest tenth.)
- d. Find Caladan's population in the year 2037 as predicted by this function.
- million (Round to the nearest tenth.)
- e. What appears to be happening to Caladan's population every 21 years?
- Every 21 years, Caladan's population about triples.
  - Every 21 years, Caladan's population about doubles.
  - Every 21 years, Caladan's stays the same.
  - none of the above

ID: 12.1.53

38. Use common logarithms or natural logarithms and a calculator to evaluate the expression.

$$\log_{16} 15$$

$\log_{16} 15 \approx$   (Round to four decimal places.)

ID: 12.3.61

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Assignment: Chapter 12 Practice

39. Use the compound interest formulas  $A = P\left(1 + \frac{r}{n}\right)^{nt}$  and  $A = Pe^{rt}$  to solve the problem given. Round answers to the nearest cent.
- Find the accumulated value of an investment of \$10,000 for 5 years at an interest rate of 6% if the money is **a.** compounded semiannually; **b.** compounded monthly; **c.** compounded continuously.
- a.** What is the accumulated value if the money is compounded semiannually?
- \$  (Round your answer to the nearest cent.)
- b.** What is the accumulated value if the money is compounded monthly?
- \$  (Round your answer to the nearest cent.)
- c.** What is the accumulated value if the money is compounded continuously?
- \$  (Round your answer to the nearest cent.)

ID: 12.1.39

40. Suppose that \$13,000 is to be invested. Which investment yields the greater return over 4 years, 10% compounded monthly or 9.90% compounded continuously?
- Choose the correct answer below.
- 10% compounded monthly
- 9.90% compounded continuously

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Assignment: Chapter 12 Practice

41. The function  $f(x) = \frac{90}{1 + 270e^{-0.122x}}$  models the percentage,  $f(x)$ , of people  $x$  years old with a certain disease. Use this function and a calculator with an  $e^x$  key to evaluate  $f(24)$  and describe what this answer means in practical terms.

$f(24) \approx \square\%$  (Round to one decimal place.)

In practical terms, this means the following.

About  $\square\%$  of  $\square$ -year-olds have the disease.

ID: 12.1.61

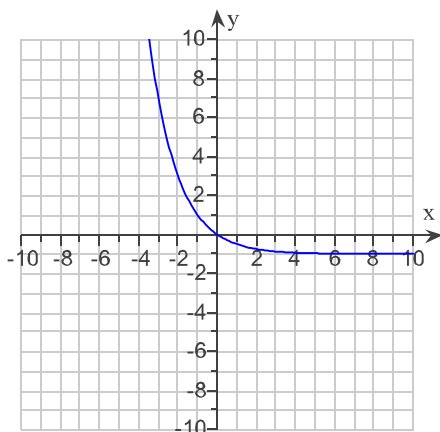
42. Approximate the following number using a calculator.

$$4\sqrt{3}$$

$4\sqrt{3} \approx \square$  (Round to three decimal places.)

ID: 12.1.3

43. Use the graph of the exponential function  $f(x) = 2^{-x} - 1$  to determine the function's domain and range.



What is the domain of  $f(x) = 2^{-x} - 1$ ?

(Type your answer in interval notation.)

What is the range of  $f(x) = 2^{-x} - 1$ ?

(Type your answer in interval notation.)

ID: 12.1.45

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1. 15.7  
2004

2. C  
1  
left  
2  
down

3. 3

4.  $\frac{\ln 7}{\ln 6}$   
1.09

5. A, 4

6.  $(-5, \infty)$

7.  $3 \log_b x + \log_b y - 5 \log_b z$

8. A,  $\frac{65}{16}$

9.  $\ln \frac{x^6}{\sqrt[3]{y}}$

10.  $\frac{1}{2} \log_g x + 3 \log_g y - 9 \log_g z$

11. C

12. A,  $\frac{e^2}{5}$   
A, 1.48

13.  $5 = \log_{14} x$

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14. A  
1.11

15.  $\ln(15x)$

16.  $-\frac{1}{4}$

17. D

18. -6

19.  $8 + \log x$

20. A, 4

21. -1

22. 1

23. 9.0

24.  $3 - \ln 10$

25. B

26.  $\frac{5}{3}$

27. D  
1  
to the right

28.  $-4 \log P$



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29. 2K

30. 2

31.  $3x^2$

32. 1.7478

33. 1

34.  $9^4 = M$

35. A, 7

36. A, 7

37. 142  
286.6  
578.3  
1167.0  
Every 21 years, Caladan's population aboutdoubles.

38. 0.9767

39. 13,439.16  
13,488.50  
13,498.59

40. 10% compounded monthly

41. 5.8  
5.8  
24

42. 11.036

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43.  $(-\infty, \infty)$   
 $(-1, \infty)$