Note: Please look on Teams for Due Date.

	Date	Day	Class Meeting Information	Assignment	Date Due
123 classes	2/18/2021	Thursday	Blue: via Zoom (see link in Teams) Green: in-person	**Chapter 7 Test** HW: 8.1	2/23/2021
	2/19/2021	Friday	Blue: via Zoom (see link in Teams) Green: in-person	**Chapter 7 Test** HW: 8.1	2/23/2021
456 classes	2/22/2021	Monday	Blue: in-person Green: via Zoom (see link in Teams)	**Chapter 7 Test** HW: 8.1	2/25/2021
	2/23/2021	Tuesday	Blue: via Zoom (see link in Teams) Green: in-person	**ACT** HW: 8.1	2/25/2021
123 classes	2/24/2021	Wednesday	Blue: in-person Green: via Zoom (see link in Teams)	HW: 8.2	3/1/2021
	2/25/2021	Thursday	Blue: via Zoom (see link in Teams) Green: in-person	HW: 8.3	3/1/2021
456 classes	2/26/2021	Friday	Blue: in-person Green: via Zoom (see link in Teams)	HW: 8.2	3/3/2021
	3/1/2021	Monday	Blue: via Zoom (see link in Teams) Green: in-person	HW: 8.3	3/3/2021
123 classes	3/2/2021	Tuesday	Blue: in-person Green: via Zoom (see link in Teams)	HW: 8.4	3/5/2021
	3/3/2021	Wednesday	Blue: via Zoom (see link in Teams) Green: in-person	HW: Chapter 8 Practice Test Part 1	3/5/2021
456 classes	3/4/2021	Thursday	Blue: in-person Green: via Zoom (see link in Teams)	HW: 8.4	3/9/2021
	3/5/2021	Friday	Blue: via Zoom (see link in Teams) Green: in-person	HW: Chapter 8 Practice Test Part 1	3/9/2021
123 classes	3/8/2021	Monday	Blue: in-person Green: via Zoom (see link in Teams)	**Chapter 8 Test Part 1**	
	3/9/2021	Tuesday	Blue: via Zoom (see link in Teams) Green: in-person	**Chapter 8 Test Part 1**	
456 classes	3/10/2021	Wednesday	Blue: in-person Green: via Zoom (see link in Teams)	**Chapter 8 Test Part 1**	

	3/11/2021	Thursday	Blue: via Zoom (see link in Teams) Green: in-person	**Chapter 8 Test Part 1**	
123 classes	3/12/2021	Friday	Blue: in-person Green: via Zoom (see link in Teams)	HW: Conics Day 1	3/31/2021
	3/29/2021	Monday	Blue: via Zoom (see link in Teams) Green: in-person	HW: Conics Day 2	3/31/2021
456 classes	3/30/2021	Tuesday	Blue: in-person Green: via Zoom (see link in Teams)	HW: Conics Day 1	4/2/2021
	3/31/2021	Wednesday	Blue: via Zoom (see link in Teams) Green: in-person	HW: Conics Day 2	4/2/2021
123 classes	4/1/2021	Thursday	Blue: in-person Green: via Zoom (see link in Teams)	HW: Conics Day 3	4/6/2021
	4/2/2021	Friday	Blue: via Zoom (see link in Teams) Green: in-person	HW: 8.5	4/6/2021
456 classes	4/5/2021	Monday	Blue: in-person Green: via Zoom (see link in Teams)	HW: Conics Day 3	4/8/2021
	4/6/2021	Tuesday	Blue: via Zoom (see link in Teams) Green: in-person	HW: 8.5	4/8/2021
123 classes	4/7/2021	Wednesday	Blue: in-person Green: via Zoom (see link in Teams)	HW: 8.6	4/12/2021
	4/8/2021	Thursday	Blue: in-person Green: via Zoom (see link in Teams)	HW: 8.7	4/12/2021
456 classes	4/9/2021	Friday	Blue: in-person Green: via Zoom (see link in Teams)	HW: 8.6	4/14/2021
	4/12/2021	Monday	Blue: via Zoom (see link in Teams) Green: in-person	HW: 8.7	4/14/2021
123 classes	4/13/2021	Tuesday	Blue: in-person Green: via Zoom (see link in Teams)	HW: 8.8	4/16/2021
	4/14/2021	Wednesday	Blue: in-person Green: via Zoom (see link in Teams)	HW: Chapter 8 Practice Test Part 2	4/16/2021
456 classes	4/15/2021	Thursday	Blue: in-person Green: via Zoom (see link in Teams)	HW: 8.8	4/20/2021

	4/16/2021	Friday	Blue: via Zoom (see link in Teams) Green: in-person	HW: Chapter 8 Practice Test Part 2	4/20/2021
123 classes	4/19/2021	Monday	Blue: in-person Green: via Zoom (see link in Teams)	**Chapter 8 Test Part 2**	
	4/20/2021	Tuesday	Blue: in-person Green: via Zoom (see link in Teams)	**Chapter 8 Test Part 2**	
456 classes	4/21/2021	Wednesday	Blue: in-person Green: via Zoom (see link in Teams)	**Chapter 8 Test Part 2**	
	4/22/2021	Thursday	Blue: via Zoom (see link in Teams) Green: in-person	**Chapter 8 Test Part 2**	

8.1 Practice Problems

Graph the following exponential functions and describe their transformations from the graph $g(x) = 4^x$. Also state the domain range, and end behavior.

1. $f(x) = 4^x + 2$ 2. $f(x) = -4^{x+1} + 2$ 3. $f(x) = 4^{x-3}$

You deposit $3500 in an account that earns 2.5% annual interest. Find the balance after three years if the interest is compounded with the given frequency.

4. annually 5. Quarterly 6. Monthly 7. Daily

8. **From 1990 to 2000, the population of California can be modeled by $P = 29{,}816{,}591(1.0128)^t$ where t is the number of years since 1990.**

a) What was the population in 1990?
b) What is the growth factor and annual percent increase?
c) Estimate the population in 2007.

Tell whether the following functions represent exponential growth or exponential decay.

9. $f(x) = 5\left(\frac{4}{5}\right)^x$ 10. $f(x) = 5(2)^{-x}$ 11. $f(x) = \frac{2}{7} \cdot 3^x$

Graph the following exponential functions and describe their transformations from the graph $(x) = \left(\frac{1}{3}\right)^x$. Also state their domain, range, and end behavior.

12. $f(x) = -2\left(\frac{1}{3}\right)^{x+1}$ 13. $f(x) = \left(\frac{1}{3}\right)^{x-2} + 4$

14. Describe the domain and range of the function $f(x) = -\frac{1}{2}\sqrt[3]{x-9} + 2$

A. Domain: $(-\infty, 9)$ Range: $(-\infty, +\infty)$
B. Domain: $(0, 9)$ Range: $(-2, 0)$
C. Domain: $(-\infty, +\infty)$ Range: $(-2, 9)$
D. Domain: $(-\infty, +\infty)$ Range: $(-\infty, +\infty)$

15. Which of the following expressions simplifies to $y^2 \cdot \sqrt{y}$?

A. $\frac{\sqrt{y^7}}{\sqrt{y^5}}$ B. $\frac{(4x^{3/2}y^{1/4})^2}{(2x^{3/4}y^{-1/2})^4}$ C. $\frac{y^{1/3}y^{3/2}}{y^{1/2}}$ D. $\frac{\sqrt{9x^7y^2}}{3\sqrt{xy}}$

16. When evaluating the function $f(x) = 5 \cdot 3^{x+2} - 6$ for any real number x, what must be true about the value of $f(x)$?

A. The value of $f(x)$ is always greater than -2

B. The value of $f(x)$ is always greater than -6

C. The value of $f(x)$ is always negative

D. The value of $f(x)$ is always positive

Factor each expression completely.

17. $5x^3 - 45x$ 18. $x^4 - 13x^2 + 36$ 19. $2x^2 + x - 3$

20. Solve: $\sqrt{9x^2 + 5x - 15} = 3x$ 21. Find $f(f(x))$ if f(x) = 7x – 1 .

22. A neighborhood recreation program serves a total of 280 children who are either 11 years old or 12 years old. The sum of the children's ages is 3,238 years. How many 11-year-old children does the recreation program serve?

A. 55 B. 122 C. 132 D. 158 E. 208

8.2 Practice Problems

Simplify the following expressions using the natural base e (a) without a calculator, and (b) with a calculator.

1. $(2e^3)^2$ 2. $e^{-5} \cdot e^{-2}$ 3. $\left(\frac{3e^3}{6e^2}\right)^3$

Simplify the following expressions using the natural base e.

4. $2e^{-3x} \cdot 6e^{x-1} \cdot e^{2x}$ 5. $-5e^{2x+6} \cdot e^{x-1} \cdot 3e^{5x}$

Graph the following functions and describe their transformations from the graph $y = e^x$. Also state the domain and range.

6. $f(x) = \frac{1}{2} e^{x-2} - 3$ 7. $f(x) = -3\, e^{x+1} + 2$

You deposit $3500 in an account that pays 5.5% annual interest compounded continuously. Find the balance after each amount of time.

8. 2 years 9. 4.5 years 10. Find the amount of interest earned in # 8 & 9

Simplify each expression (no decimal answers). Write all answers with positive exponents. Assume all variables have positive values. Show your work!

11. $12\sqrt[3]{2z^5} - z\sqrt[3]{54z^2}$ 12. $\frac{36^{1/4}}{5 \cdot 125^{1/4}}$ 13. $\frac{-4}{\sqrt[3]{49}}$ 14. $\sqrt[3]{27x^9}$

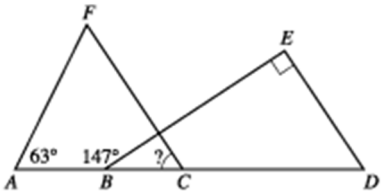
Factor completely.

15. $27x^3 - 64$ 16. $x^4 - 16$ 17. $x^2 - 6x - 55$ 18. $x^2 + 12x + 48$

19. A particular jeweler uses the formula $d = \sqrt[3]{\frac{4w}{0.02847}}$ to relate the average diameter (d) of a cultured pearl in millimeters to its weight (w) in carats. The jeweler sells the pearls to customers for $3.25 per carat. How much would a cultured pearl with a 9.5 mm average diameter cost?

20. Solve for x: $\sqrt{x-3} = 5 - \sqrt{x+2}$ 21. Solve for x: $x - 5 = \sqrt{x+7}$

22. In the figure below, *A*, *B*, *C*, and *D* are collinear, *FC* is parallel to *ED*, *BE* is perpendicular to *ED*, and the measures of ∠*FAB* and ∠*EBA* are as marked. What is the measure of ∠*FCB* ?



A. 33° B. 57° C. 63° D. 84° E. Cannot be determined from the given information

8.3 Practice Problems

Rewrite the following in either exponential form or logarithmic form

1. $\log_3 81 = 4$ 2. $4^0 = 1$ 3. $\log_5 0.2 = -1$ 4. $\left(\frac{1}{5}\right)^{-1} = 5$

Evaluate the logarithmic functions without a calculator.

5. $\log_4 2$ 6. $\log_8 1$ 7. $\log_4 4^{2/3}$ 8) $\log 1000$ 9) $\ln e$

Evaluate the functions with a calculator.

10. $\log 0.3$ 11. $\log 12$ 12. $\ln 2.5$

Simplify the following using inverse properties

13. $7^{\log_7 x}$ 14. $\log_{11} 11^x$ 15. $\log_6 36^x$ 16. $e^{\ln 4x}$

17. $3^{\log_3 5} + \ln(e^{12}) - 2\log_4 64 - log10^6$ 18. $e^{ln23} - \log_5 625 + \log_{\frac{1}{2}} 8$

19. How much money must be deposited now in an account paying 5.3% annual interest, compounded weekly, to have a balance of $1500 after 8 years?

Simplify completely without using a calculator.

20) $\ln e^{-17}$ 21) $\log_2 16^{5x}$ 22) $\log 100^8$ 23) $e^{\ln 9x}$

24) Charles has $15,000 that he wants to invest for 4 years. He can either invest the money with Bank #1, earning 3.4% compounded monthly, or he can invest the money with Bank #2, earning 3.2% compounded continuously. Which bank should he use? Show your calculations and justify your conclusion.

25. Which of the following equations represent exponential decay? (you may choose more than one)

I.	$f(x) = \frac{2}{3}e^{2x}$	III.	$f(x) = 5e^{7x}$
II.	$f(x) = 0.25e^{-4x}$	IV.	$f(x) = 10e^{-3x}$

26. For all nonzero real numbers *p*, *t*, *x*, and *y* such that $\frac{x}{y} = \frac{3p}{2t}$, which of the following expressions is equivalent to *t* ?

F. $\frac{y}{2}$ G. $\frac{3px}{2y}$ H. $\frac{6py}{x}$ I. $\frac{3py}{x}$ J. $\frac{3py}{2x}$

8.4 Practice Problems

Find the inverse of the following functions

1. $y = \log_7 x$ 2. $y = \ln(x-1) - 3$ 3. $F(x) = \log_2 8^{x-1}$ 4. $y = \ln x + 2$

Graph the following functions, and state their transformations (for #5, 7 from $y = \log_8 x$; for 6, 8 from $y = \ln x$) and their domain and range.

5. $y = \log_8 (x+1)$ 6. $y = -3 \ln (x+1)$ 7. $f(x) = \log_8 (x-3) + 1$ 8. $y = \frac{1}{2} \ln x - 3$

Describe the transformation from the parent function, $y = \sqrt{x}$, identify the domain and range, and then sketch the graph.

9. $y = -\sqrt{x-5}$ 10. $y = -3\sqrt{x-1} + 2$

Describe the transformation from the parent function, $y = \sqrt[3]{x}$, identify the domain and range, and then sketch the graph.

11. $y = \sqrt[3]{x+3} + 4$ 12. $y = -2\sqrt[3]{x} + 5$

Rewrite each equation as a logarithmic or exponential equation. Then solve for x.

13) $\log_5 x = 2$ 14) $\log_3 27 = x$ 15) $\ln x = 0$ 16) $4^x = 16$

17. Which of the following sets of equations are NOT inverses of each other?

A. $y = \log_2(x-1)$
$y = 2^x + 1$

C. $y = 3^x + 4$
$y = \log_3 x - 4$

B. $y = \log_3 x + 7$
$y = 3^{x-7}$

D. $y = 5^{x+2}$
$y = \log_5 x - 2$

18. Simplify : $\log_3 81 - \ln(e^7) - \log 10^8 + \log_5 625$

19. The graph of which function is vertically stretched by a factor of 6 and translated 2 units right from the graph of the parent function?

A. $y = 6 \log_3(x-2)$ **C.** $y = \log_3(6x+2)$

B. $y = 6(3^{x+2})$ **D.** $y = 3^{6x-2}$

Graph the following functions, and describe the transformations (for #20 – 21, from $h(x) = \log_2 x$; for #22 – 23, from $g(x) = \ln x$) and the domain and range.

20. $y = \log_2 (x+1)$ 21. $f(x) = \log_2 (x-2) + 3$ 22. $f(x) = \ln (x-2)$ 23. $f(x) = -2 \ln (x-1) + 3$

24. If n = 8 and $16 \cdot 2^m = 4^{n-8}$, then m = ?

F. -4 G. -2 H. 0 I. 1 J. 8

Practice Test Part 1

Graph the following function and describe the transformations from their parent function. Then state the domain and range.

1. parent function: $y = 4^x$ Graph: $y = 4^{(x-3)} + 5$
2. Parent function: $y = \left(\frac{2}{5}\right)^x$ Graph: $y = -3\left(\frac{2}{5}\right)^{(x+1)} - 2$
3. Parent function: $y = e^x$ Graph: $y = e^{x-2} + 4$
4. Parent function: $y = \log_2 x$ Graph: $f(x) = \log_2 (x+1) - 6$
5. Parent function: $y = \ln x$ Graph: $f(x) = -1/2 \ln x$

6. Find the value of $1000 deposited for 10 years in an account paying 7% annual interest compounded daily.
7. Find the value of $1000 deposited for 8 years in an account paying 8% annual interest compounded weekly.

8. Write the equation $\log_{243} 729 = \frac{6}{5}$ in exponential form.

9. Write the equation $3^x = 100$ in logarithm form.

Evaluate the following without using a calculator:

10. $\log_3 27$ 11. $\log 100$ 12. $3\log_2 4$

13. $\ln e$ 14. $e^{\ln 5}$ 15. $8^{\log_8 11}$

16. $\ln e^3 - \log_2 \frac{1}{16} + \log 100$ 17. $\log 10 - e^{\ln 16} + 4\log_4 256$

Find the inverse of each function:

18. $y = \ln(x + 3)$ 19. $y = 4^{3x}$ 20. $y = \log_6(x - 1)$

21. Is $y = 2.9^x$ an example of exponential growth or decay? How about $y = 3^{-x}$?

Day 1 Practice:

For #1-8: Identify each conic as a parabola or circle and then write the standard equation.

1) $y - x^2 + 2x = 0$ 2) $x^2 - 8x + y^2 = 33$ 3) $y^2 + 2y - 3x = 5$
4) $3x^2 + 3y^2 + 24y - 18x - 27 = 0$ 5) $y - x^2 - 10x = 27$

6) $x^2 - 6x - 10y = 2 - y^2$ 7) $2x^2 + 2y^2 - 20y + 18 = 0$

8) $y^2 - 12y + 16x - 60 = 0$

9) Write the standard equation of a circle with a radius of 3 that has been translated right 5 units and up 8 units from the origin.

10) Given the equation $x = y^2$, translate the graph left 1 unit and up 5 units.

11) Given the equation $y = x^2$, translate the graph down 3 units and right 1 unit.

12) You deposit $1,500 dollars into an account that earn 3.4% interest, compounded weekly. Find the balance after 5 years.

13) How long would it take to double $3,000 invested in an account that pays 5.25% compounded continuously?

Day 2 Practice:

For #1-8, Identify each conic as an ellipse or hyperbola then write the standard equation.

1) $x^2 + 9y^2 - 2x - 8 = 0$ 2) $25y^2 - 100y + 100 - x^2 = 25$ 3) $x^2 + 4y^2 = 64$
4) $9x^2 - 4y^2 - 18x + 8y = 31$ 5) $9x^2 - 4y^2 + 54x + 8y + 41 = 0$

6) $4x^2 + 25y^2 + 16x + 50y = 59$ 7) $y^2 + 6y - 11 = 4x^2 + 8x$

8) $3x^2 + y^2 - 2y = -18x - 4$

9) Describe the end behavior of the function $f(x) = -\left(\frac{1}{3}\right)^{x+2} - 1$

10) Simplify $\sqrt[3]{x^{11}} \cdot \sqrt[4]{x}$ 11) Find the inverse of $f(x) = \frac{1}{7}x^3 - 2$ 12) Solve for x: $\sqrt{x-3} = 5 - \sqrt{x+2}$

8.5 Practice Problems

Evaluate the following logarithmic expressions using log 4 ≈ 0.602 and log 7 ≈ 0.845

1. log 28 2. $\log \frac{49}{64}$ 3. $\log \frac{1}{7}$ 4. log 112

Expand the following expressions

5. $\log_3 3x$ 6. $\log_5 \frac{6x^4}{2y}$ 7. $\ln\sqrt{xy}$ 8. $\ln\frac{1}{2x^2}$ 9. $\log_6 \frac{5x^3}{y}$

Condense the following expressions

10. log 3 + ½ log x – log 5 11. 2ln x – ln 3 + ln 6 12. 3 ln(x + 1) – 2 ln y + ln y + ln 2

13. log 4 + 3 log x + log y 14. log 9 + 3 log 2 – log 3

Evaluate the following using the change of base formula (give exact and approximate solutions):

15. $\log_7 12$ 16. $\log_5 1.25$ 17. $\log_{2.2} 22$ 18. $\log_6 24$

You deposit $3500 in an account that pays 5.2% annual interest. Find the balance after 4 years if the interest is compounded:

19. monthly 20. Daily 21. continuously

Solve each equation. Simplify radical answers. Show your work and check for extraneous solutions.

22. $\sqrt[3]{x} - 9 = -1$ 23. $\sqrt{x-6} = x - 8$ 24. $(x-4)^{2/3} - 9 = 16$

8.6 Practice Problems

Solve the following exponential and logarithmic equations. For #1 – 4, give both decimal and exact answers.

1. $e^{2x} = 4$ 2. $9^x = 35$ 3. $10^{x+2} - 12 = 22$ 4. $3(2^{x+6}) + 2 = 17$

5. $3^{4x} = 27$ 6. $100^{3x-1} = 1000^{x+8}$ 7. $\left(\frac{2}{5}\right)^{x+7} = \left(\frac{4}{25}\right)^{10}$ 8. $0.75^{5x-2} = \left(\frac{27}{64}\right)^{x-6}$

9. $210 + 4^x = 3 \cdot 4^x$ 10. $27 - 3 \cdot 2^x = 17 + 2 \cdot 2^x$

11. How long would it take for an investment of $9,000 to grow to $12,000, if it is in an account that earns 6% interest, compounded continuously?

12. How long would it take for $200 to earn $50 in interest in an account earning 5.5% interest, compounded annually?

13. How much money must be deposited now in an account paying 7% annual interest, compounded monthly, to have a balance of $2000 after 5 years?

Solve each equation. If needed, round to 2 decimal places.

14. $6^{3x} - 7 = 15$ 15. $200\ e^{0.07t} = 500$ 16. $7e^{3x} = 312$ 17. $2^{x+2} = 3^{2x+1}$

18. Solve for x: $2.5^{8x-4} = \left(\frac{125}{8}\right)^{2x+4}$ 19. Solve: $7^{x+1} = 6^{2x+5}$

20. Scientists experimenting with the effects of a new antibiotic on a particular bacteria population found that the a population of bacteria can be modeled with the function $f(x) = 2000(1 - 0.25)^t$, where t is the time in days the antibiotic is taken. Scientists have also discovered that this antibiotic can only be taken for a maximum 5 days before it is considered harmful to the patient. In order to consider a person "cured" of the bacterial infection, an initial population of 2000 bacteria must be reduced to less than 200. Is it possible to cure a person with the new antibiotic?

21. A sample of two bacteria strains are being studied at a lab. After h hours, the population of Bacteria M is modeled by $M(h) = 20(1.8)^h$, and Bacteria N is modeled by $N(h) = 30(1.65)^h$. When is the population of Bacteria M greater than the population of Bacteria N?

A. The population of Bacteria M is always greater than the population of Bacteria N.

B. The population of Bacteria M is never greater than the population of Bacteria N.

C. The population of Bacteria M is greater until a point between 4 and 5 hours, after which Bacteria N has the greater population.

D. The population of Bacteria N is greater until a point between 4 and 5 hours, after which Bacteria M has the greater population.

8.7 Practice Problems

Solve the following logarithmic equations. Check for extraneous solutions.

1. $\log_7(2 - x) = \log_7 5x$
2. $7 - \log_3 8x = 2$
3. $\ln(x + 3) + \ln(2x) = \ln(2x + 2)$
4. $2 \log x = 12$
5. $7 + 3 \ln x = 15$
6. $\ln (x + 4) + \ln (x - 2) = \ln 7$
7. $\log_2 (x - 7) = 3 - \log_2 x$
8. $\log x + \log (x + 15) = 2$
9. $4 \ln x - 3 = 11$

10) Describe the transformation of $f(x) = -2 \ln x - 3$ from the function $g(x) = \ln x$.

11) The population of deer in a forest preserve can be modeled by the equation $P = 50 + 200 \ln (t + 1)$, where t is the time in years from the present. In how many years will the deer population reach 1000?

12) Simplify: $\dfrac{\sqrt[3]{c^5} \cdot \sqrt[3]{c^4}}{\sqrt[3]{c^{10}}}$

13) Simplify: $\sqrt[3]{16b^5c^2d^{12}}$

14. Condense the expression to a single logarithm: $3 \log_4 5 - \log_4 y + 2 \log_4 x$

15. Give an exact solution for the following equation: $62 + 2 \cdot 8^x = 14 + 3 \cdot 8^x$

16. Solve for x: $\log_9(x + 7) + \log_9 x = \log_9(2x) + \log_9(x + 5)$

17. Solve: $\log_4(x + 3) = 2 - \log_4(x - 3)$

8.8 Practice Problems

1. Miguel and Dee determined slightly different equations to model the recommended chair seat height, in inches, for children x years old. (Miguel: $y = 4.37 \ln x + 5.52$; Dee: $y = 4.52 \ln x + 5.35$) For what age do the two models give the same chair seat height?

2. Latrell wants to double an investment of $3,500 that earns interest at an annual rate of 6% compounded continuously. Which equation can he solve to find the doubling time *t* for this investment?

A. $7000 = 3500 \ln 0.06t$ B. $7000 = 3500e^{0.06t}$ C. $7000 = 3500(1.06)^t$ D. $7000 = 3500 \log_{0.06} t$

3. The half-life of cesium-137 is 30 years. Which equation gives the time *t* (in years) needed to reach a percent *p* of remaining radioactive substance?

A. $t = \log_{\frac{1}{2}}(\frac{3p}{10})$ B. $t = \log_{\frac{1}{2}}(\frac{10}{3p})$ C. $t = \frac{\log_{\frac{1}{2}}(\frac{p}{100})}{30}$ D. $t = 30 \log_{\frac{1}{2}}(\frac{p}{100})$

4. The formula $L = 10(\log I + 12)$ gives the sound level *L* (in decibels) for a sound with intensity *I* (in watts/m^2). What is the intensity of a sound whose sound level is 124 decibels?

5. Scientists have determined that the population for a particular species in a habitat can be modeled by the equation $P = (500t - 180)^{6/7}$. How many years (t) will it take the species to grow to 729 members?

6. A person wants to invest $4800 in a savings account for 7 years. The bank offers the two options below. Explain which option the person should choose.

Option A	**Option B**
Interest Compounded Monthly $A = P\left(1 + \frac{r}{n}\right)^{nt}$ Rate: 2.7%	Interest Compounded Continuously $A = Pe^{rt}$ Rate: 2.65%

7. Which of the following functions would NOT produce the same graph as $(x) = 256^x$?

A. $h(x) = 2^{8x}$ B. $h(x) = 4^{4x}$ C. $h(x) = 8^{3x}$ D. $h(x) = 16^{2x}$

8. Write an exponential function in the form $y = ab^x$ to model the set of data given in the data below.

x	0	1	2	3	4	5
$\ln y$	-0.693	0.405	1.504	2.603	3.701	4.800

9. Three people in the business club are competing to see who can double their investment in the shortest amount of time. Each person starts with an initial amount of $3000, but they each choose different investment scenarios. Who will double their investment first based on the following information?

Person A	**Person B**	**Person C**
Interest compounded quarterly $A = P\left(1 + \frac{r}{n}\right)^{nt}$ Rate: 6.2%	Interest compounded daily $A = P\left(1 + \frac{r}{n}\right)^{nt}$ Rate: 5.9%	Interest compounded continuously $A = Pe^{rt}$ Rate: 5.7%

Practice Test Part 2

1. How long would it take for $1000 deposited in an account paying 6% interest compounded continuously to earn $200 interest?

2. How much money must be deposited now in an account paying 8% annual interest, compounded quarterly, to have a balance of $1000 after 10 years?

3. How much money must be deposited now in an account paying 7% annual interest, compounded continually, to have a balance of $1000 after 6 years?

4. How long will it take $2500 to double if it earns interest that is compounded monthly at a rate of 3.8%?

For #5 –15: Solve for *x*. Round to the nearest hundredth, if needed.

5. $x = \log_7 49$

6. $0 = \log_8 x$

7. $\log_x 64 = 2$

8. $\log 2x = 2$

9. $\ln(2x - 3) = \ln 21$

10. $\log_4(x+2) + \log_4(x-1) = \log_4 10$

11. $5^{x-1} = 8$

12. $3e^{2x-1} = 18$

13. $3\ln x + 7 = 5$

14. $\frac{1}{343} = 7^{2x+6}$

15. $4 - 3 \cdot 6^x = 6^x$

16. Condense the expression: $2\log_7 2x - \log_7 3y + 4\log_7 z$

17. Expand the expression: $\ln \frac{12x^4}{5y^6}$

18. Condense the expression: $\frac{1}{3}\ln 8 + 4\ln x - 2\ln y + \frac{1}{2}\ln z$

Use the change-of-base formula to evaluate the expression. Write the exact answer and an approximate solution to 3 decimals.

19. $\log_2 9$

20. $\log_3 5$

21. Suppose that the magnitude of an earthquake measures 7.5 on the Richter scale. Find the amount of energy E released by this earthquake $m = 2/3 \log (E/10^{11.8})$

Solve each equation. If needed, round the nearest hundredth.

22. $5^{2x} + 4 = 14$

23. $300\ e^{0.07t} = 400$

24. $7 \log x = 13$

25. $4 + 5 \ln x = 20$

26. $\ln(x+3) + \ln(x-5) = \ln 33$

27. $9e^{-4x} = 40$

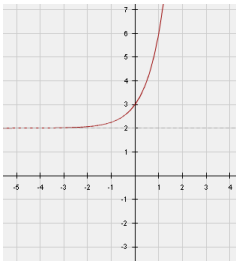
28. $6^{x+1} = 5^{2x+3}$

29. $\log_2 x + \log_2 (x-6) = 4$

30. $\log_4(x-3) = 1 - \log_4 x$

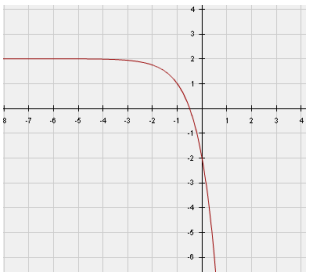
Unit 8 Practice ANSWERS:

8.1 Answers

1. 

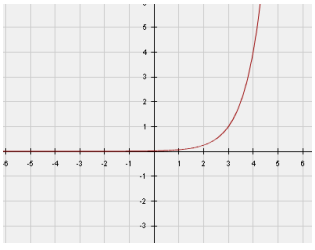
Up 2

D: $(-\infty, \infty)$; R: $(2, \infty)$

2. 

reflect over $y = 2$, up 2, left 1

D: $(-\infty, \infty)$; R: $(-\infty, 2)$

3. 

right 3

D: $(-\infty, \infty)$; R: $(0, \infty)$

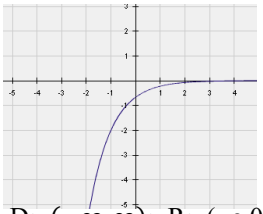
$as\ x \to -\infty, y \to 2$ $as\ x \to -\infty, y \to 2$ $as\ x \to -\infty, y \to 0$

$as\ x \to \infty, y \to \infty$ $as\ x \to \infty, y \to -\infty$ $as\ x \to \infty, y \to \infty$

4. $3769.12 5. $3771.71 6. $3772.30 7. $3772.58 8. a) 29,816,591 b)1.0128, 1.28% c) 37,013,552

9. Decay 10. Decay 11. Growth

12. reflect over x-axis; vertical stretch by factor of 2; left 1

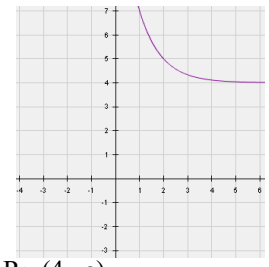


D: $(-\infty, \infty)$; R: (-∞,0)

$as\ x \to -\infty, y \to -\infty$

$as\ x \to \infty, y \to 0$

13. Right 2, up 4



D: $(-\infty, \infty)$; R: $(4, \infty)$

$as\ x \to -\infty, y \to \infty$

$as\ x \to \infty, y \to 4$

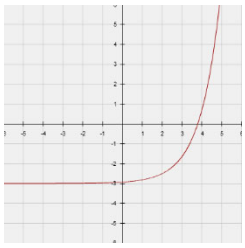
14. D 15. *B* 16. B

17. $5x(x + 3)(x – 3)$ 18. (x + 3)(x – 3)(x + 2)(x – 2) 19. (2x + 3)(x – 1) 20. 3 21. 49x – 8 22. B

8.2 Answers

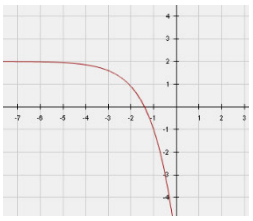
1. a) $4e^6$ b) 1613.72 2. a) $\frac{1}{e^7}$ b) 0.0009119 3. a) $\frac{e^3}{8}$ b) 2.511 4. $\frac{12}{e}$ 5. $-15e^{8x+5}$

6. vertical compression by a factor of 2, right 2, down 3



D: $(-\infty, \infty)$; R: (-3, ∞)

7. Reflect over y = 2, vertical stretch by factor of 3,



left 1, up 2

D: $(-\infty, \infty)$; R: (-∞,2)

8. $3906.97 9. $4482.87 10. a) $406.97 b) $982.87

11. $9z \cdot \sqrt[3]{2z^2}$ 12. $\frac{\sqrt[4]{180}}{25}$ 13. $\frac{-4\sqrt[3]{7}}{7}$ 14. $3x^3$

15. $(3x – 4)(9x^2 + 12x + 16)$ 16. $(x + 2i)(x – 2i)(x + 2)(x – 2)$ 17. $(x – 11)(x + 5)$ 18. Not factorable (prime)

19. $19.83 20. x = 7 21. x = 9 22. B

8.3 Answers

1. $3^4 = 81$ 2. $\log_4 1 = 0$ 3. $5^{-1} = 0.2$ 4. $\log_{1/5} 5 = -1$ 5. ½

6. 0 7. 2/3 8. 3 9. 1 10. -0.523 11. 1.079

12. 0.916 13. x 14. x 15. 2x 16. 4x 17. 5

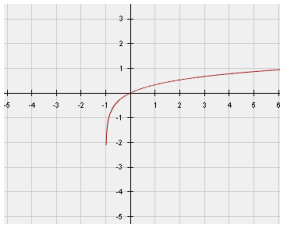
18. 16 19. $981.85 20. -17 21. 20*x* 22. 16 23. 9*x*

24. Charles should use Bank #1. After 4 years investing in Bank #1, Charles would have $17,181.92, but after investing in Bank #2 for the same amount of time, Charles would have only $17,048.30, which is a smaller amount of money. 25. II and IV 26. J

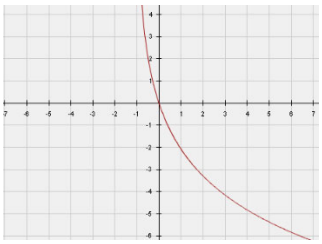
8.4 Answers

1. $y = 7^x$ 2. $y = e^{(x+3)} + 1$ 3. $y = (x+3)/3$ 4. $y = e^{(x-2)}$

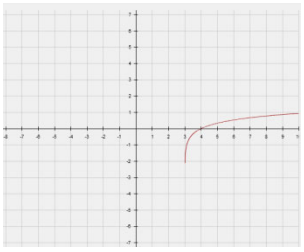
5. left 1; D: $(-1, \infty)$; R: $(-\infty,\infty)$



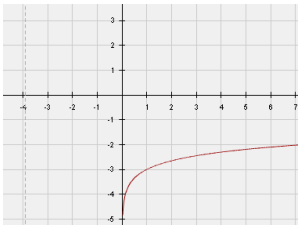
6. Reflection in y = 0, vertical stretch by a factor of 3, left 1, D: $(-1, \infty)$; R: $(-\infty,\infty)$



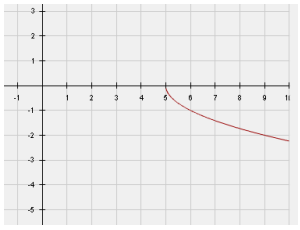
7. right 3, up 1; D: $(3, \infty)$; R: $(-\infty,\infty)$



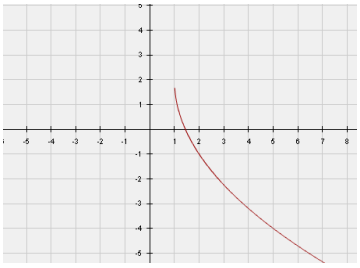
8. Vertical compression by a factor of 2, down 3 ; D: $(0, \infty)$; R: $(-\infty,\infty)$



9. reflection over $y = 0$, right 5
D: $[5, \infty)$; R: $(-\infty, 0]$

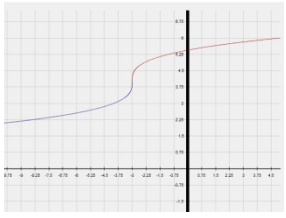


10. reflection over $y = 2$, vertical stretch by a factor of 3, right 1, up 2 D: $[1, \infty)$; R: $(-\infty, 2]$



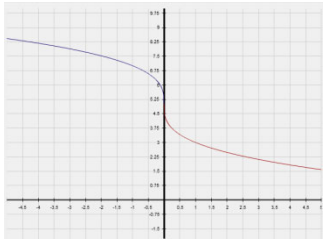
11. left 3, up 4

D: $(-\infty,\infty)$ R: $(-\infty,\infty)$



12. reflection over $y = 5$, vertical stretch by a factor of 2, up 5

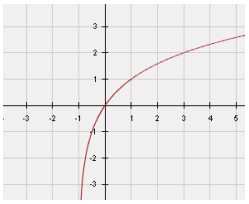
D: $(-\infty,\infty)$ R: $(-\infty,\infty)$



13) $5^2 = x$; 25 14) $3^x = 27$; 3 15) $e^o = x$; 1 16) $\log_4 16 = x$; 2

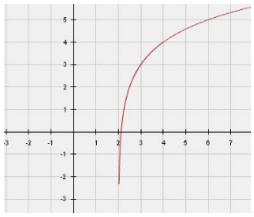
17) C 18) -7 19) *A*

20. left 1



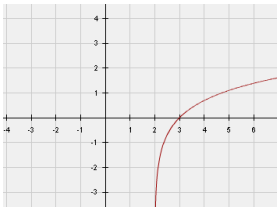
D: (-1, ∞) ; R: (-∞,∞)

21. Right 2, up 3



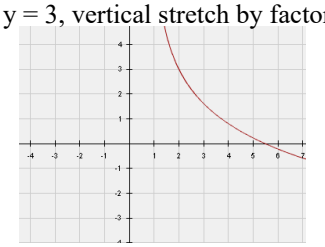
D: (2, ∞) ; R: (-∞,∞)

22. Right 2



D: (2, ∞) ; R: (-∞,∞)

23. Reflection in y = 3, vertical stretch by factor of 2, right 1, up 3

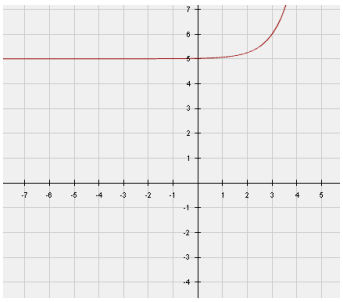


D: (1, ∞) ; R: (-∞,∞)

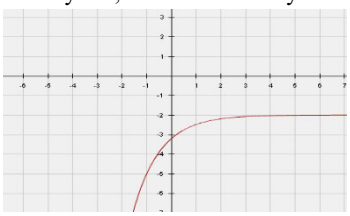
24. F

Test Part 1 Practice Answers

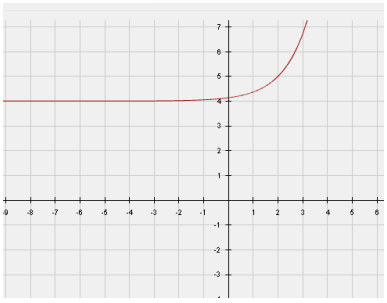
1. right 3, up 5; D: (-∞,∞); R: (5, ∞)



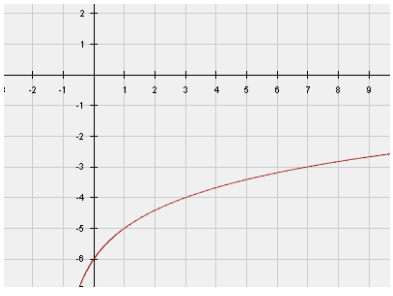
2. Reflect in y = 2, vertical stretch by a factor of 3, left 1, down 2; D: (-∞,∞); R: (-∞, -2)



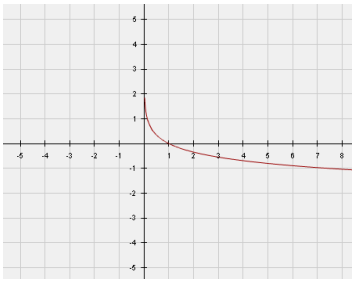
3. right 2, up 4; D: (-∞,∞); R: (4, ∞)



4. Left 1, down 6; D: (-1, ∞); R: (-∞,∞)



5. Reflection in y = 0, vertical compression by a factor of 2; D: (0, ∞) ; R: (-∞,∞)



6. $2013.62 7. $1895.55 8. $243^{6/5} = 729$ 9. $\log_3 100 = x$

10. 3 11. 2 12. 6 13. 1 14. 5 15. 11 16. 9

17. 1 18. $y = e^x - 3$ 19. $y = \frac{log_4 x}{3}$ 20. $y = 6^x + 1$ 21.Growth; decay

Day 1 Practice Answers:

1. $y = (x-1)^2 - 1$ Parabola 2. $(x-4)^2 + y^2 = 49$ Circle 3. $x = \frac{1}{3}(y+1)^2 - 2$ Parabola

4. $(x-3)^2 + (y+4)^2 = 34$ Circle 5. $y = (x+5)^2 + 2$ Parabola

6. $(x-3)^2 + (y-5)^2 = 36$ Circle 7. $x^2 + (y-5)^2 = 16$ Circle 8. $x = -\frac{1}{16}(y-6)^2 + 6$ Parabola

9. $(x-5)^2 + (y-8)^2 = 9$ 10. $x = (y-5)^2 - 1$

11. $y = (x-1)^2 - 3$ 12. $1,777.86 13. About 13.2 years

Day 2 Practice Answers:

1. $\frac{(x-1)^2}{9} + \frac{y^2}{1} = 1$ Ellipse 2. $\frac{(y-2)^2}{1} - \frac{x^2}{25} = 1$ Hyperbola 3. $\frac{x^2}{64} + \frac{y^2}{16} = 1$ Ellipse

4. $\frac{(x-1)^2}{4} - \frac{(y-1)^2}{9} = 1$ Hyperbola 5. $\frac{(x+3)^2}{4} - \frac{(y-1)^2}{9} = 1$ Hyperbola

6. $\frac{(x+2)^2}{25} + \frac{(y+1)^2}{4} = 1$ Ellipse 7. $\frac{(y+3)^2}{16} - \frac{(x+1)^2}{4} = 1$ Hyperbola

8. $\frac{(x+3)^2}{8} + \frac{(y-1)^2}{24} = 1$ Ellipse 9. $as\ x \to \infty, f(x) \to -1, as\ x \to -\infty, f(x) \to -\infty$

10. $x^{\frac{47}{12}}$ 11. $f^{-1}(x) = \sqrt[3]{7x+14}$ 12. $x = 7$

8.5 Answers

1. 1.447 2. -0.116 3. -0.845 4. 2.049

5. $1 + \log_3 x$ 6. $\log_5 6 + 4\log_5 x - \log_5 2 - \log_5 y$ 7. $\frac{1}{2}\ln x + \frac{1}{2}\ln y$

8. $-\ln 2 - 2\ln x$ 9. $\log_6 5 + 3\log_6 x - \log_6 y$ 10. $\log\frac{3x^{1/2}}{5}$ 11. $\ln 2x^2$

12. $\ln\frac{2(x+1)^3}{y}$ 13. $\log 4x^3y$ 14. log 24 15. $\frac{\log 12}{\log 7}$; 1.277 16. $\frac{\log 1.25}{\log 5}$; 0.139

17. $\frac{\log 22}{\log 2.2}$; 3.920 18. $\frac{\log 24}{\log 6}$; 1.774 19. $4307.31 20. $4309.18 21. $4309.25

22. 512 23. 10 24. -121, 129

8.6 Answers

1. 0.693; $\frac{ln4}{2}$ 2. 1.618; $\frac{ln35}{ln9}$ 3. -0.469;log (34) - 2 4. -3.678; $\frac{\ln 5}{\ln 2} - 6$ 5. $\frac{3}{4}$

6. $\frac{26}{3}$ 7. 13 8. -8 9. 3.357 10. 1

11. 4.795 years 12. 4.168 years 13. $1410.81 14. 0.58

15. 13.09 16. 1.27 17. 0.19 18. 8

19. -4.282 20. No 21. D

8.7 Answers

1. 1/3 2. 30.375 3. $-1 \pm \sqrt{2}$ 4. 1,000,000 5. 14.39 6. 3

7. 8 8) 5 9) 33.116 10) Down 3 units, reflection in the *x*-axis, vertical stretch by a factor of 2

11) 114.58 years 12) $\frac{\sqrt[3]{c^2}}{c}$ 13) $2bd^4\sqrt[3]{2b^2c^2}$ 14. $\log_4 \frac{125x^2}{y}$

15. $\frac{\log 48}{\log 8}$ 16. No solution 17. 5

8.8 Answers

1. about 3.1 years old 2. B 3. D 4. 2.5 watts/m^2 5. 4.73 years

6. Option A 7. C 8. $y = .5(3)^x$ 9. Person A

Practice Test Part 2 Answers

1. 3.04 years 2. $452.89 3. $657.05 4. 18.27 years 5. 2 6. 1 7. ± 8 8. 50

9. 12 10. 3 11. 2.29 12. 1.40 13. 0.51 14. -4.5 15. 0

16. $log_7 \frac{4x^2z^4}{3y}$ 17. ln 12 + 4 ln *x* – ln 5 – 6 ln y 18. $\ln \frac{2x^4\sqrt{z}}{y^2}$ 19. $\frac{\log 9}{\log 2}$; 3.17 20. $\frac{\log 5}{\log 3}$; 1.46 21. 1.12×10^{23}

22. 0.72 23. 4.11 24. 71.97 25. 24.53 26. 8 27. -0.37

28. -2.13 29. 8 30. 4