

Section 11.1 (Rational Exponents)

Name _____

Evaluate each expression.

1. $\frac{8^{\frac{2}{3}}}{8^{\frac{1}{3}}}$

2. $\left(\frac{4}{5}\right)^{-2}$

3. $343^{\frac{2}{3}}$

4. $\sqrt[3]{8^3}$

5. $\sqrt{5} \cdot \sqrt{10}$

6. $9^{-\frac{1}{2}}$

Simplify each expression.

7. $(5n^3)^2 \cdot n^{-6}$

8. $\left(\frac{x^2}{4y^{-2}}\right)^{-\frac{1}{2}}$

9. $(64x^6)^{\frac{1}{3}}$

10. $(5x^6y^4)^{\frac{1}{2}}$

11. $\sqrt{x^2y^3} \cdot \sqrt{x^3y^4}$

12. $\left(\frac{p^{6a}}{p^{-3a}}\right)^{\frac{1}{3}}$

Express each using rational exponents.

13. $\sqrt{x^5 y^6}$

14. $\sqrt[5]{27x^{10}y^5}$

15. $\sqrt{144x^6 y^{10}}$

16. $21 \sqrt[3]{c^7}$

17. $\sqrt{1024a^3}$

18. $\sqrt[4]{36a^8 b^5}$

Express each using radicals.

19. $64^{\frac{1}{3}}$

20. $2^{\frac{1}{2}} a^{\frac{3}{2}} b^{\frac{5}{2}}$

21. $s^{\frac{2}{3}} t^{\frac{1}{3}} v^{\frac{2}{3}}$

22. $y^{\frac{3}{2}}$

23. $x^{\frac{2}{5}} y^{\frac{3}{5}}$

24. $(x^6 y^3)^{\frac{1}{2}} z^{\frac{3}{2}}$

Logarithmic Functions

Write each equation in exponential form.

1. $\log_3 81 = 4$

2. $\log_8 2 = \frac{1}{3}$

3. $\log_{10} \frac{1}{100} = -2$

Write each equation in logarithmic form.

4. $3^3 = 27$

5. $5^{-3} = \frac{1}{125}$

6. $\left(\frac{1}{4}\right)^{-4} = 256$

Evaluate each expression.

7. $\log_7 7^3$

8. $\log_{10} 0.001$

9. $\log_8 4096$

10. $\log_4 32$

11. $\log_3 1$

12. $\log_6 \frac{1}{216}$

Solve each equation.

13. $\log_x 64 = 3$

14. $\log_4 0.25 = x$

15. $\log_4(2x-1) = \log_4 16$

16. $\log_{10} \sqrt{10} = x$

17. $\log_7 56 - \log_7 x = \log_7 4$

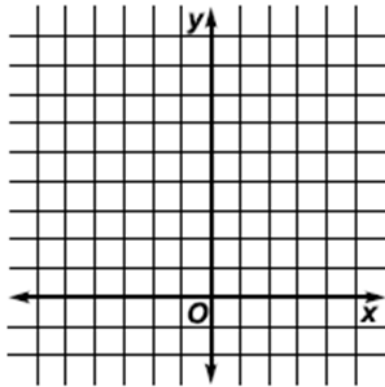
18. $\log_5(x+4) + \log_5 x = \log_5 12$

Section 11.2 and 11.4 (Graphing – Day 2)

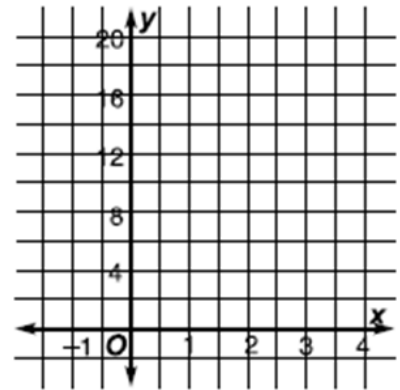
Name _____

Graph each exponential function or inequality.

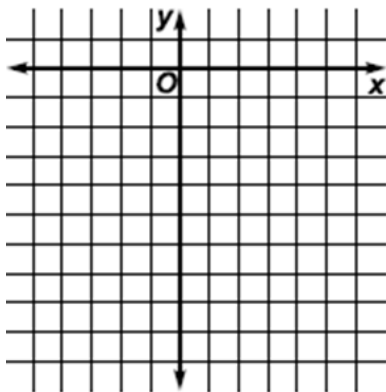
1. $y = 2^{x-1}$



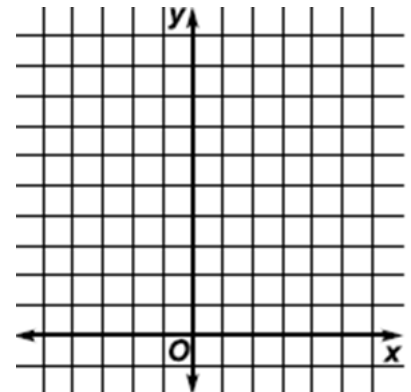
2. $y = 4^{-x+2}$



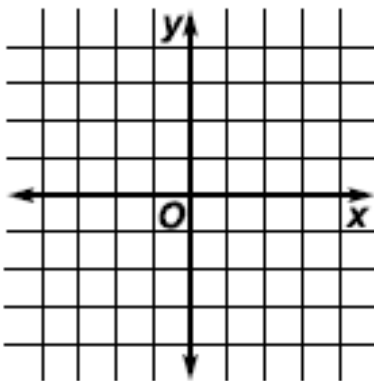
3. $y > -3^x + 1$



4. $y \geq 0.5^x$



5. $y \geq \log_3(x+2)$



- 1. Demographics** An area in North Carolina known as The Triangle is principally composed of the cities of Durham, Raleigh, and Chapel Hill. The Triangle had a population of 700,000 in 1990. The average yearly rate of growth is 5.9%. Find the projected population for 2010.

- 2. Finance** Determine the amount of money in a savings account that provides an annual rate of 4% compounded monthly if the initial investment is \$1000 and the money is left in the account for 5 years.

- 3. Investments** How much money must be invested by Mr. Kaufman if he wants to have \$20,000 in his account after 15 years? He can earn 5% compounded quarterly.

- 4. Chemistry** How long would it take 100,000 grams of radioactive iodine, which has a half-life of 60 days, to decay to 25,000 grams? Use the formula $N = N_0 \left(\frac{1}{2}\right)^t$, where N is the final amount of the substance, N_0 is the initial amount, and t represents the number of half-lives.

Section 11.5 (Common Logs)

Name _____

Given that $\log 3 = 0.4771$, $\log 5 = 0.6990$, and $\log 9 = 0.9542$, evaluate each log.

1. $\log 300,000$

2. $\log 9000$

3. $\log 75$

4. $\log 0.0005$

5. $\log 27$

6. $\log 81$

Evaluate each expression.

7. $\log 66.3$

9. $\log 7(4^3)$

Find the value of each logarithm using the change of base formula.

10. $\log_6 832$

11. $\log_{11} 47$

12. $\log_3 9$

Solve each equation or inequality.

13. $8^x = 10$

14. $1.8^{x-5} = 19.8$

15. $4^{2x} > 25$

16. $2.4^x \leq 20$

17. $3^{5x} = 85$

18. $3^{2x-2} = 2^x$

Convert each log to a natural log.

7. $\log_4 94$

8. $\log_5 256$

9. $\log_9 0.712$

Use natural logs to solve each equation.

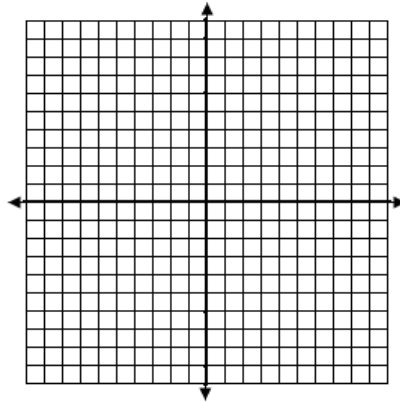
10. $6^x = 42$

11. $7^x = 4^{x+3}$

12. $1249 = 175e^{-0.04t}$

Exponential Extras

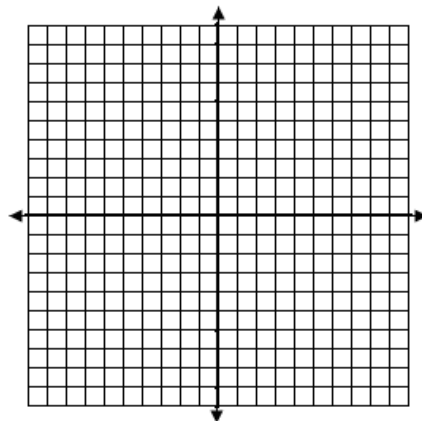
1. Graph the exponential functions $y = 3^x$, $y = 3^x + 5$, and $y = 3^x - 4$ on the same set of axes. In complete sentences, compare and contrast the graphs. *LABEL EACH*



2. Between 1990 and 2000, the population of Florida had an annual growth rate of about 2.14%. If the state's population was 15,989,069 in 2000, approximately what was Florida's population in 1990?

3. Determine the amount of money in a savings account providing an annual rate of 3% compounded daily if Sandra made a one-time deposit of \$8500 in to the account and left it there for 5 years.

4. Graph $y > 3^x - 2$.



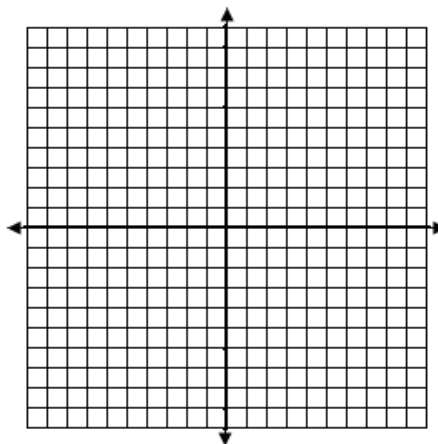
5. Jared purchases a new car for \$26,400. The car loses 21.5% of its value each year.

a. Write a function to model the VALUE of the car.

b. Find the value of the car after 4 months of ownership

c. Find the value of the car after three years of ownership.

d. Graph the function and use the graph to verify your answer in part b.



6. Compare the balance after 15 years of a \$20,000 investment earning 7% interest compounded continuously to the same investment compounded quarterly.

7. Write each equation in exponential form.

a. $\log_{32} 8 = \frac{3}{5}$

b. $\log_{81} 3 = \frac{1}{4}$

8. Write each equation in logarithmic form.

a. $6^4 = 1296$

b. $2^{-8} = \frac{1}{256}$

9. Evaluate the expression $\log_3 \frac{1}{27}$.

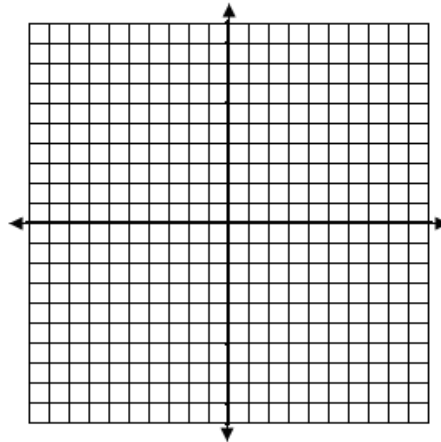
10. Given that $\log 4 = 0.6021$, evaluate the logarithm: $\log 40,000$

11. Evaluate each expression.

a. $\log 4(3)^4$

b. $\log \frac{22^3}{4}$

12. Graph $y < \log(x + 2)$.



13. Find the value of $\log_8 550$ using the change of base formula.

14. Convert $\log_4 325$ to a natural logarithm and evaluate.

15. Solve $6.7 = -8.2 \ln x$.

16. Solve the equation by using natural logarithms: $4^{3x} = 5^{x-8}$