Name _____ Class _____ Date _____

Practice

Form G

Exponential Functions

Determine whether each table or rule represents a linear or an exponential function. Explain.

1.

x	1	2	3	4
y	3	9	27	81

2.

x	1	2	3	4
y	3	9	15	21

3. $y = 5 \cdot 2^x$

4. $y = 6 \cdot x^3$

5. $y = 3x - 8$

6. $y = 4 \cdot 0.3^x$

Evaluate each function for the given value.

7. $f(x) = 5^x$ for $x = 4$

8. $h(t) = 3 \cdot 4^t$ for $t = -3$

9. $y = 8 \cdot 0.7^x$ for $x = 3$

Graph each exponential function.

10. $f(x) = 3^x$

11. $y = 0.25^x$

12. $y = 8 \cdot 1.2^x$

13. What is the solution or solutions of $3^x = 5x$?

14. An investment of \$8000 in a certain Certificate of Deposit (CD) doubles in value every seven years. The function that models the growth of this investment is $f(x) = 8000 \cdot 2^x$, where x is the number of doubling periods. If the investor does not withdraw any money from this CD, how much money will be available for withdrawal after 28 years?

15. A population of amoebas in a petri dish will triple in size every 20 minutes. At the start of an experiment the population is 800. The function $y = 800 \cdot 3^x$, where x is the number of 20 minute periods, models the population growth. How many amoebas are in the petri dish after 3 hours?

16. A new car costs \$15,000 to build in 2010. The company's financial analysts expect costs to rise by 6% per year for the 10 years they are planning to build the car. The cost to build the car can be modeled by the function $f(t) = 15{,}000\,(1.06)^t$, where t is the number of years after 2010. How much will it cost the company to build the car in 2017?

Name _____ Class _____ Date _____

Practice (continued) *Form G*

Exponential Functions

Evaluate each function over the domain $\{-2, -1, 0, 1, 2, 3\}$. As the values of the domain increase, do the values of the range *increase* or *decrease*?

17. $f(x) = 3^x$

18. $y = 4.2^x$

19. $m(x) = 0.3^x$

20. $g(t) = 4 \cdot 3^x$

21. $y = 50 \cdot 0.1^x$

22. $f(x) = 2 \cdot 4^x$

Which function has the greater value for the given value of x?

23. $y = 5^x$ or $y = x^5$ for $x = 2$

24. $y = 300 \cdot x^3$ or $y = 100 \cdot 3^x$ for $x = 4$

Solve each equation.

25. $3^x = 81$

26. $5 \cdot 2^x = 40$

27. $4^x + 4 = 68$

28. $3 \cdot 2^x - 16 = 80$

29. Reasoning The function that models the growth of a $1000 investment that earns 7% per year is $f(x) = 1000(1.07)^x$. How do you think you would write a function that models the growth of $1500 that earns 8% per year? Use that function to determine how much money a person would have after 5 years if she invested $1500 in an account earning 8% per year.

30. Writing Discuss the differences between exponential functions with a base of 2 and 3, $y = 2^x$ and $y = 3^x$, and quadratic and cubic functions $y = x^2$ and $y = x^3$. Focus on the shapes of the different graphs and rates of growth.

31. Open-Ended Find the value of each of the functions a) $f(x) = 2x^2$ and b) $f(x) = 2 \cdot 2^x$ for $x = 5$. Write another quadratic function and another exponential function with a base of two whose values at $x = 5$ are between the values you found for functions a and b.