8R Quarter 2 Cumulative Test – What to Know ...

Growing, Growing, Growing

- Create a table and a graph of an exponential growth or decay relationship given a description or equation
- Write an exponential growth or decay equation given a graph, table, or two points
- Write expressions in exponential, expanded, and standard form
- Write numbers in scientific notation and standard form
- Perform operations with scientific notation
- Write an exponential equation with a y-intercept other than 1
- Identify whether a table is linear, exponential, or neither based on a table, graph or equation
- Write the equation of a linear or exponential relationship given a table, graph, or equation
- Estimate when an exponential relationship will reach a certain number
- Calculate a growth or decay factor from a table, graph, or two points
- Calculate a growth or decay factor given a rate
- Calculate a growth or decay rate given a factor
- Simplify monomial expressions either by expanding or using the laws of exponents
- Simplify monomial expressions that contain fractional exponents

It's In The System

- Write a linear equation in standard form given a description of a situation
- Go from standard form to slope intercept form and back again
- Identify slope, x-intercept, and y-intercept from equations in standard form and slope intercept form
- Graph a linear equation in standard form and slope intercept form
- Solve a system of linear equations by graphing and finding the point of intersection
- Write a system of equations given a description of a situation
- Solve a system of linear equations by using equivalent forms, substitution, or combination/elimination
- Solve a linear inequality in one variable and graph your solution on a number line

Practice Problems

1. Write an equation for the line passing through the points (-2, 3) and (1, -3).

2. Write an equation for the line passing through the points (17, 8) and (17, -2).

3. Write an equation for the line passing through the points (-3, 5) and (-7, 8).

4. Find the equation of the line that has a slope of m=4 and passes through the point (-1, -6).

5. Find the equation of the line that passes through the points (-2,4) and (1,2).

6. Find an equation of the line that passes through the points (4, 5) and (7, -1).

7. Write an equation for the line that passes through the points (2, 7) and (6, 15).



8. Write the equation of the line below.

Given the following equations, solve for x:

9.
$$\frac{7(2x+3)}{5} = 21$$

10. $\frac{2}{3}x - 5 = 3x + 7$

11.
$$6x - (3x + 8) = 16$$

12. $5x + 2(x + 4) = 64$

13.
$$13 - (2x + 2) = 2(x + 2) + 3x$$

14. $5x - 6 = \frac{2 - x}{3} + 4$

15.
$$3(2x-5) + 4 = 5 - 2x$$

16. $4x - 5 - 2x = 3 - 10 + 3x$

17.
$$10 - \frac{1}{2}x = 4 + \frac{1}{3}x + 1$$

18. $\frac{x}{-2} + 5 = 3$

31. Garden City introduced a recycling program. The goal of the program is to reduce the number of pounds of trash sent to landfills by 25% each year. In 2000, Garden City produced 100,000 tons of trash. If the recycling program were to reach its goal, how many tons of trash can Garden City expect to produce in the year 2020?

32. Jasmine wins \$5000 on a scratch ticket and invests it at a rate of 3.5% compounded annually. How much money will she have after 15 years?

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33. At a national park, the decay factor for the bear population is 0.87 each year. The decay rate for the fox population is 17% per year. Which population has the greatest percent of their population remaining each year?

34. Given the equation $y = 250(.65)^x$, what is the decay rate?

35. Fill in the missing values in the table for this exponential relationship

# of Hours	# of Bacteria
2	176
3	
4	2816
5	11264
6	

What is the equation?

36.



Write an exponential equation that models the number of mice (p) for a given number of months (t).

37. A population of bugs has a growth factor of 4. After year 2, there are 480 bugs. After year 3, there are 1,920 bugs. Write the equation that models the population growth.

38. Which of the following is growing at the fastest rate: a growth factor of 2.3, a growth rate of 230%, the equation $y = 30(1.99)^x$, or a growth rate of 199%? Explain.

39. What is the decay factor for the following table? What is the decay rate?

x	3	4	5	6
У	190	142	107	80

40. A boat costs \$15,500 and decreases in value by 10 percent per year. How much will the boat be worth after 5 years?

- 41. The equation $y = 2(3^x)$ might represent the growth pattern for a population of mice. Complete the following sentences. Your sentence should describe the pattern in words.
 - i. The population started with _____ mice.
 - ii. The population grew at a rate of _____ percent.
 - iii. In 8 years, the equation predicts the population of mice to be ______.

42. In 1995, there were 85 rabbits living in the Sprague lower field woods. The population increased by 12% each year. How many rabbits were in the Sprague woods in 2005?

43. Mr. Clarke has discovered a strain of bacteria! The bacteria culture initially contained 1000 bacteria and the bacteria are doubling every half hour. Write an equation to match this situation and then determine how many bacteria are present after 3 hours?

Study the patterns in the following tables. For each table:

- Tell whether the relationship between *x* and *y* is linear, inverse, exponential, or neither.
- Explain how you know the relationship is linear, inverse, exponential, or neither.
- If the relationship is linear, inverse, exponential, write an equation for it.

44.	Х	5	-5	-13	-17
	У	-2	3	7	9



	X	0	1	2	3	4
46 .	У	0	2	4	8	16

47.	Х	1	2	3	4	5
	V	1	1	3	9	27
	У	12	4	4	4	4

48.

x	0	1	2	3	4	5
y	2.3	3.8	5.3	6.8	8.3	9.8

49.

X	0	1	2	3	4	5
y	$\frac{1}{16}$	$\frac{1}{4}$	1	4	16	64

50.

Х	у
-2	-4
-1	-1
0	2
1	5
2	8
3	11

Tennis Tournament:

Rounds	1	2	3	4
Players left	64	32	16	8

52.

x	3	4	5	6
У	11	8.25	6.6	5.5

53.	x	-2	2	4	6
	у	-7	-1	2	6

54. Each of the four relationships below is represented by a situation, equation, table, and graph. Complete the table to match the different representations to the correct relationship.

Relationship	Situation	Equation	Table	Graph
Linear				
Inverse Variation				
Exponential				

<u>Situations</u>

- **A.** The area of a rectangular enclosure is 240 square meters. The dimensions can change, but the area is fixed.
- B. Every week, ,you add \$10 to your piggy bank. There was \$240 in your piggy bank to start.
- **C.** There were 240 wolves in Northern Michigan last year. Every year, the population grows by 10%.

Equations

D.
$$y = \frac{240}{x}$$
 E. $y = 240(1.10)^x$ **F.** $y = 10x + 240$

<u>Tables</u>

			-					
G.	X	У	Н.	X	У	I.	X	У
	1	250		1	240		1	264
	2	260		2	120		2	290
	3	270		3	80		3	319
	4	280		4	60		4	351
	5	290		5	48		5	386

<u>Graphs</u>





Simplify the following. All final answers must contain positive exponents.



Write the following numbers in proper Scientific Notation form:

63.4,500, 20064.0.00013

65. 27×10^3 66. 43×10^{-7}

Write the following numbers in Standard form:

67. 3.201×10^2 68. 1.17×10^{-5}

 $69. 4.785 \times 10^{-6} 70. 6.03458 \times 10^4$

Simplify the following expression and express your answer in proper scientific notation form. You should be able to do these without a calculator.

71. $(4.0 \times 10^4)(1.6 \times 10^5)$ 72. $(2.4 \times 10^{-2})(3.0 \times 10^{-5})$

73. $(4.0 \times 10^4) \div (2.5 \times 10^3)$ 74. $(5.4 \times 10^5) \div (6.0 \times 10^{-4})$

Write each of the following equation in <u>slope-intercept</u> form. Identify the slope, x-intercept, and y-intercept.

75.
$$\frac{2}{3}x - \frac{1}{5}y = 2$$
 76. $3x + 4y = -12$

77. 9x - 2y = 4078. -2x + 6y - 4 = 0

Write each of the following equation in <u>Standard Form</u> (Ax + By = C). Identify the slope, x-intercept, and y-intercept.

79.
$$y = \frac{2}{3}x - 12$$
 80. $y = \frac{3}{4}x + \frac{1}{3}$

81. $-3x + 5 = \frac{1}{7}y$

Solve the following systems of equations using the most efficient method.

82.
$$\begin{cases} x + 3y = 34 \\ -5x + 6y = 40 \end{cases}$$
83.
$$\begin{cases} -x + y = -11 \\ 3x + y = 3 \end{cases}$$

84.
$$\begin{cases} y = \frac{1}{2}x + 3 \\ y = -2x - 7 \end{cases}$$
 85.
$$\begin{cases} 3x = 1 + y \\ -6x + 2y = 5 \end{cases}$$

86.
$$\begin{cases} y = 2x + 10 \\ y = 3x + 12 \end{cases}$$
87.
$$\begin{cases} 3x - 4y = 10 \\ -8y = 20 - 6x \end{cases}$$

88.
$$\begin{cases} 2x + 2y = 3\\ x = 4y - 1 \end{cases}$$
89.
$$\begin{cases} y = \frac{5}{4}x - 5\\ 5x - 4y = -10 \end{cases}$$

90.
$$\begin{cases} 3x + 2y = 12 \\ x - 3y = 26 \end{cases}$$
 91.
$$\begin{cases} 5x + 8y = -4 \\ 2x - 5y = -18 \end{cases}$$

Solve for x.

96. $-20x - 11 \ge 14 + 15x$ 97. 6y - 4(y + 5) < 40 - 3y

98. 3x - 7 > 5x + 13 99. 2 - 5x < 3x - 14

100. $3x + 20 \le 32$ 101. -3x + 11 > 32

102. 14 < 8x - 2 103. $20x - 11 \ge 14 + 15x$

104. Write the inequality for the graph:



105. You are planning a skating party at a rink that charges a \$38 rental fee plus an additional \$6.50 per person. You don't want to spend more than \$175. Write and solve an inequality to determine the maximum number of friends you can invite.

Solve the inequality and graph your solution on a number line.

106. 3x - 14 < 5x + 2 107. $-6x + 15 \le 1$



108. $\frac{2}{3}(5-3x) \le 12x$

109. -2(x + 4) > 6x - 4

Write and solve a linear system of equations for each of the following problems.

110. For dinner, Randy had 10 chicken McNuggets and one medium fries for 840 calories. Jack had 6 chicken McNuggets and two medium fries for 1036 calories. How many calories are there in each item?

111. At Billy's preschool, they have bicycles and tricycles, with a total of 57 wheels. The number of bicycles is three less than three times the number of tricycles. How many **of each kind of bike** are there?

112. A test has twenty questions worth 10 points. The test consists of True/False questions worth 3 points each and multiple choice questions worth 11 points each. How many multiple choice questions are there on the test?

113. Two small pitchers and one large pitcher can hold 8 cups of water. One large pitcher minus one small pitcher constitutes 2 cups of water. How many cups of water can each pitcher hold?

Simplify the following. All final answers must contain positive exponents.

114.
$$(81x^8)^{\frac{1}{2}}$$
 115. $g^{\frac{5}{4}} \bullet h^{\frac{3}{2}} \bullet g^{\frac{7}{4}} \bullet h^{\frac{5}{2}}$

116.
$$(25x^4y^6)^{\frac{5}{2}}$$
 117. $\left(\frac{128d^5e^3}{2d^2e^9}\right)^{\frac{1}{3}}$