

Algebra 8 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

Data Analysis

- Calculate unit prices
- Calculate averages and understand how an individual measurement effects the calculated average.
- Create a bar graph given data
- Create a circle graph given data
- Calculate the number of degrees of the central angle of a circle graph given data.

Practice Problems

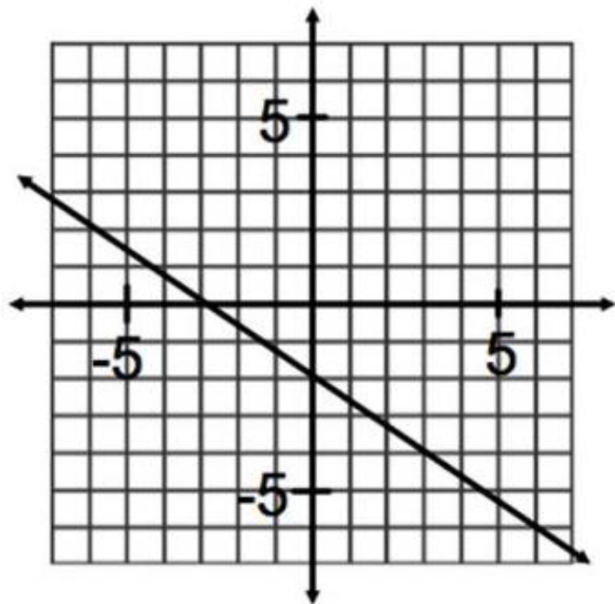
1. Write an equation for the line passing through the points $(-2, 3)$ and $(1, -3)$.
2. Write an equation for the line passing through the points $(17, 8)$ and $(17, -2)$.
3. Write an equation for the line passing through the points $(-3, 5)$ and $(-7, 8)$.
4. Find the equation of the line that has 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:

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

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

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

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

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?

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?

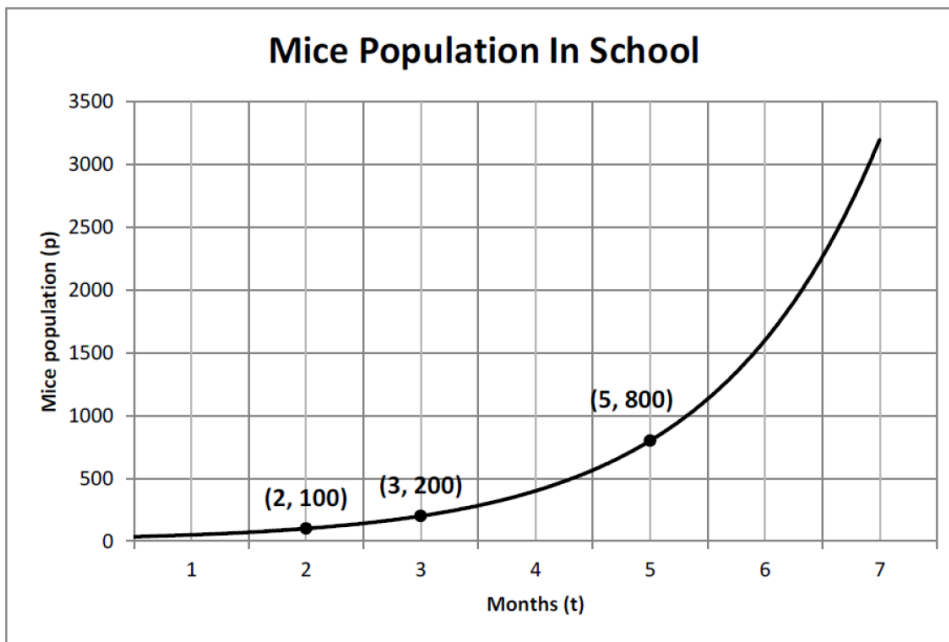
34. Given the equation $y = 250(.65)^x$, what is the decay rate?

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
y	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, exponential, or neither.
- Explain how you know the relationship is linear, exponential, or neither.
- If the relationship is linear, exponential, write an equation for it.

44.

x	5	-5	-13	-17
y	-2	3	7	9

46.

x	0	1	2	3	4
y	0	2	4	8	16

47.

x	1	2	3	4	5
y	$\frac{1}{12}$	$\frac{1}{4}$	$\frac{3}{4}$	$\frac{9}{4}$	$\frac{27}{4}$

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.

x	y
-2	-4
-1	-1
0	2
1	5
2	8
3	11

51.

Tennis Tournament:

Rounds	1	2	3	4
Players left	64	32	16	8

52.

x	-2	2	4	6
y	-7	*1	2	6

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

53. $5b^2 \cdot 8b$	54. $10xy^3 \cdot 8x^5y^3$
55. $(2b^2)^4$	56. $5x^3y^4 \cdot (2x^2y^4)^3$

$$57. \frac{14x^4y^7}{6x^5y^4}$$

$$58. \left(\frac{-6x^2y}{2xy^3}\right)^3$$

$$59. \frac{7x^2y^5}{4xy^9} \cdot \frac{8x^{10}y}{-2x^4y^4}$$

$$60. 6a^2(-2ab^4)^3$$

$$61. \left[\left(3x^4y^7z^{12}\right)^5 \left(-5x^9y^3z^4\right)^2 \right]^0$$

$$62. (3x)^{-2}$$

Write the following numbers in proper Scientific Notation form:

63. 4,500, 200

64. 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. 4.785×10^{-6}

70. 6.03458×10^4

Simplify the following expression and express your answer in proper scientific notation form.

71. $(4.0 \times 10^4)(1.6 \times 10^5)$

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

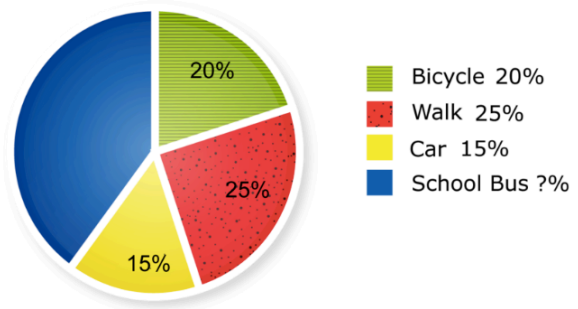
73. $(4.0 \times 10^4) \div (2.5 \times 10^3)$

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

75. The circle graph to the right represents the responses from 300 students at Elmwood Middle School.

What percent of the students ride the bus to school?

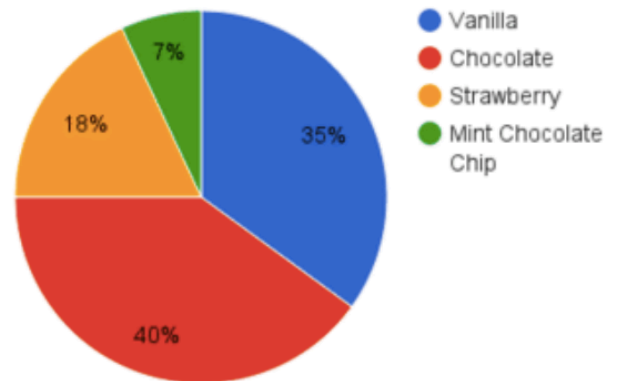
Method of Transportation to School



How many students travel by car?

76. Calculate the number of degrees in the central angle for each flavor of ice cream represented in the graph below.

Favorite Ice Cream Flavors

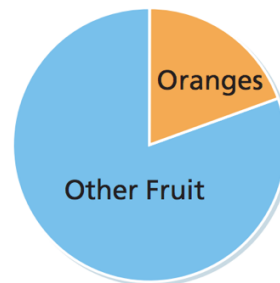


If 350 people were surveyed, how many chose chocolate as their favorite flavor?

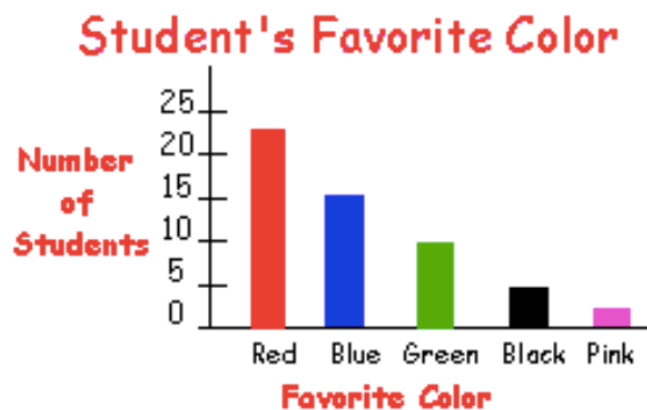
How many chose Strawberry?

76. The circle graph shows the results of a survey in which people were asked, "What is your favorite fruit?" The angle of 68° represents 277 people who said their favorite fruit is oranges.

Find the approximate sample size.



77. 50 students were asked what was their favorite color. The bar graph of the data collected is below.



Calculate the number of degrees in the central angle representing each color if you were to create a circle graph.

78. Jason earned scores of 85, 92, and 95 on his science tests. What does he need to earn on his next science test to have an average of 93%?
79. Chicken is on sale for \$2.29/lb. How much would a 3 ounce serving cost?
80. The average weight of an apple is 5 ounces. Approximately how many apples are in a 5 pound bag?