

Name _____

Unit 5 Study Guide: Rates, Ratios, & Proportional Reasoning Vocabulary:

1. Percent: a fraction or ratio in which the denominator is 100
 2. Proportion: an equation which states that two ratios are equal
 3. Ratio: compares two quantities that share a relationship
 4. Unit Rate: A rate with a denominator of 1
 5. Rate: A ratio comparing 2 different units
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Part A: Ratios, Rates, & Unit Rates

- I have completed Section A and checked my answers on Weebly.
- I can compare quantities using ratios and rates and convert rates to unit rates. I can also apply units rates to real-life situations.
- I need help with understanding Section A.

Use the figure below to write each ratio three ways.



6. shaded to white figures _____

7. circles to stars _____

8. shaded figures to total figures _____

Use the following address to write each ratio three ways.

36541 Riverside Road

9. numbers to letters _____ 10. vowels to consonants _____

11. consonants to numbers _____ 12. letters to complete address _____

Solve.

13. Out of 28 students in the class, 21 wore sneakers to school. What is the ratio of students who wore sneakers to those who did not wear sneakers? _____

14. Of the 18 students at a dance camp, 6 are boys. What is the ratio of girls to students at the camp?

15. The ratio of games the Falcons won to the games they lost is 7:5. What is the ratio of games won to the total number of games played? _____

Write each ratio in three ways.

16. A baseball team won 7 out of 15 games.

- a. wins to total games
- b. wins to losses

17. A jack for a car requires a force of 120lb. to lift a 3,000lb. car. What is the ratio of the car's weight to the force required to lift the car? Write the ratio in simplest form.

18. A 17-min telephone call from Boston to Chicago costs \$2.38. What is the cost per minute?

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19. You drove 120 miles in 2 hours. How many miles per hour is this?

20. A midsize car can travel 200 mi on 7 gal of gasoline. A minivan can travel 350 mi on 12 gal. Which has the greater fuel efficiency?

Find each unit rate. Then determine the better buy.

21. popcorn: 15 oz. for \$1.69
30oz. for \$2.49

22. tennis balls: \$2.25 for 3 tennis balls
\$6.24 for 8 tennis balls

23. A chef uses 1 cup of cheese per 2 cups of milk in a casserole. How many cups of cheese are needed if the chef uses 6 cups of milk? _____

24. Jason scored 30 goals in 15 soccer games. **Using the unit rate**, how many goals will he score in 20 games? _____

25. Amy's puppy gained 36 pounds in 9 weeks. **Using the unit rate**, how many pounds did the puppy gain in 5 weeks? _____

Part B: Solving Proportions

- I have completed Section B and checked my answers on Weebly.
 I can solve proportions and apply them to real-life.
 I need help with understanding Section B.

Determine if the ratios are proportional.

26. $\frac{15}{21}, \frac{5}{7}$

27. $\frac{6}{9}, \frac{9}{15}$

28. $\frac{15}{6}, \frac{9}{4}$

29. $\frac{20}{12}, \frac{15}{9}$

30. If a 10 pound turkey takes 4 hours to cook, how long will it take a 16 pound turkey to cook?

31. A recipe calls for 2 eggs to make 10 pancakes. How many eggs will you need to make 35 pancakes?

32. An order of 5 paintbrushes costs \$3.50. If each paintbrush costs the same amount, what is the cost for an order of 3 paintbrushes?

33. There are 3 instructors per 18 students at a tennis camp. At that rate, how many instructors are needed for 30 students?

Solve the following proportions.

34. $\frac{3}{4} = \frac{9}{n}$

35. $\frac{6}{2} = \frac{21}{n}$

36. $\frac{x}{55} = \frac{18}{22}$

37. Of the 40 students in the marching band, 3 out of every 5 play the trumpet. How many students in the marching band play the trumpet?

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Part C: Solving Percent Problems

- I have completed Section C and checked my answers on Weebly.
 I can use proportional reasoning to solve percent problems.
 I need help with understanding Section C.

38. What percent of 36 is 9?

39. 15 is 30% of what number?

40. What percent of 20 is 4?

41. 70% of what number is 91?

42. What is 72% of 325?

43. Emma has already read 7 of the 20 books on her summer reading list. Express the percent of books she has read as a decimal and a percent.

44. Kathleen earned \$820 working a summer job. If she saved 55% of her money, how much did she save?

45. Of the 100 students who went on the picnic, 62 had fruit in their lunch boxes. Express the percent of students with fruit as a decimal and as a fraction in simplest form.

46. A pet store's shipment of tropical fish was delayed. Forty percent of the 1,500 fish died. How many fish died?

47. During the summer Rosa earns \$950. She saved 40%, how much did she save?

48. A dance club printed 400 tickets for its annual show and sold 85% of them. How many they sell?

49. The Lions won 75% of their 28 games this year. How many games did they win?

50. 56 percent = 56 out of _____

51. In a survey, two in every 25 people said they watched TV last night. What is this figure as a percentage?

52. The class treasury totals \$210. Forty percent of this was earned from the art show. How much money was earned from the art show?

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Part D: Function Tables and Graphing

- I have completed Section D and checked my answers on Weebly.
- I can use proportional reasoning to graph functions.
- I need help with understanding Section D.

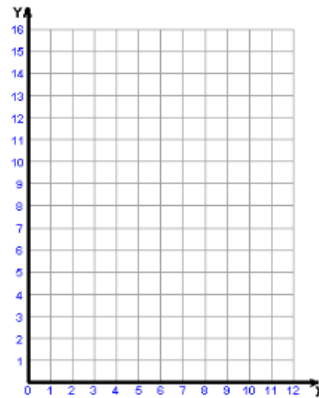
53. Complete the function table. What is the rule? _____

INPUT (X)	OUTPUT (Y)
1	60
2	120
3	180
4	
5	

54. Movies are rented for \$2.50 at Video-Rama. What is the charge to rent x number of movies?
First, write the function. _____

Second, create a function table.

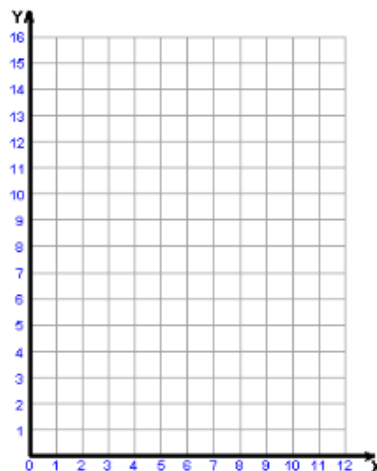
Third, graph the function.



55. The table below shows the total number of pencils in different numbers of packages.
Write an equation that could be used to find the total number of pencils, y , in x packages.

NUMBER OF PACKAGES (X)	NUMBER OF PENCILS (Y)
2	12
3	18
5	30
6	36

Then graph the function.

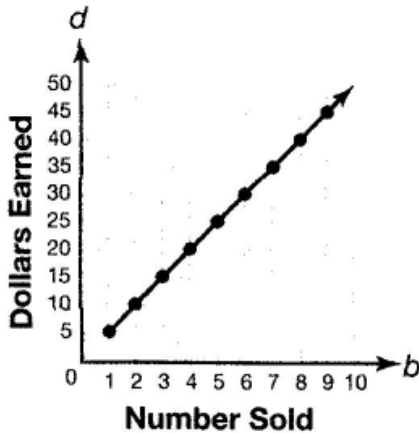


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56. Write the equation that represents the relationship shown in the table. _____

X	Y
0	3
1	5
2	7
3	9

57. Eric makes wooden puzzle boxes. The graph shows the number of dollars, d , Eric earns for each puzzle box, b , he sells. List the ordered pairs shown on the graph. Which is the independent variable? Which is the dependent variable? Write an equation that expresses the relationship between the number of puzzle boxes sold and the amount Eric earns.



Ordered Pairs: _____

Independent: _____

Dependent: _____

Equation: _____

Part E: Direct Proportions/Variation

- I have completed Section E and checked my answers on Weebly.
- I can use proportional reasoning identify and graph direct variations and identify the constant of proportionality.
- I need help with understanding Section E.

Tell whether the following tables are examples of direct variation. If so, write the equation and identify the constant of proportionality

58.

X	1	2	3	4
Y	2	4	6	8

59.

X	1	2	3	4
Y	5	7	9	11

60.

X	1	2	3	4
Y	60	30	20	15

61.

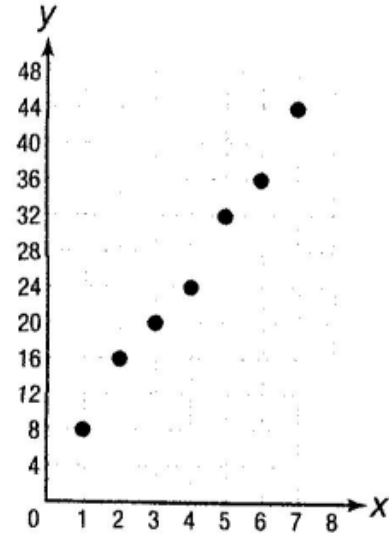
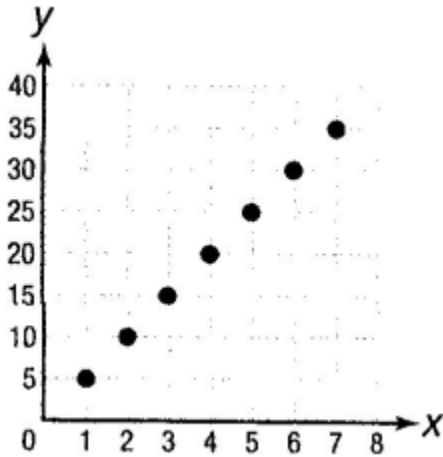
X	1	2	3	4
Y	3	6	9	12

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State whether or not the plotted points could show a direct proportion relationship. **If they could, write the equation and identify the constant of proportionality.**

62.

63.



64. There are 47 skittles in a bag.
Complete the table below.

# of Bags	Total # of Skittles
1	47
2	94
3	141
4	
5	
6	
7	
8	
9	

Using the table, write an equation using $y = kx$.

What is the constant of proportionality? _____

Use the formula to determine how many skittles there would be in 50 bags. _____

Part: F
Open Ended

65. Javier has a new job designing websites. He is paid at a rate of \$700 for every 3 pages of web content that he builds. Create a ratio table to show the total amount of money Javier has earned in ratio to the number of pages he has built.

Total Pages Built								
Total Money Earned								

Javier is saving up to purchase a used car that costs \$4,300. How many web pages will Javier need to build before he can pay for the car?

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66. Susan and John are buying cold drinks for a neighborhood picnic. Each person is expected to drink one can of soda. Susan says that if you multiply the unit price for a can of soda by the number of people attending the picnic, you will be able to determine the total cost of the soda. John says that if you divide the cost of a 12-pack of soda by the number of sodas, you will determine the total cost of the sodas. Who is right and why?

67. Josie took a long multiple-choice, end-of-year vocabulary test. The ratio of the number of problems Josie got incorrect to the number of problems she got correct is 2:9. If Josie missed 8 questions, how many did she get right?

68. The grocery store is selling lettuce at a cost of 5 pounds for \$4.00.

Part A

Carol needs 2 pounds of lettuce and can buy it at the advertised price. If there is no tax on food, is \$2.00 enough to buy the lettuce she needs? Show your work.

Part B

What is the unit rate for lettuce at this grocery store? Show your work and state your answer in a complete sentence.

Part C

How many pounds of lettuce can you buy for \$12.00? Show your work.

69. Devon is trying to find the unit price on a 6-pack of drinks on sale for \$2.99. His sister says that at that price, each drink would cost just over \$2.00. Is she correct, and how do you know? If she is not, how would Devon's sister find the correct price?

70. The Sparkling House Cleaning Company has cleaned 28 houses this week. If this number represents 40% of the total number of houses they are contracted to clean, how many total houses will the company clean by the end of the week?

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73. The table below shows the relationship between the number of cans and the weight of those cans in ounces.

Number of Cans	Weight (in ounces)
4	128
8	256
12	384

a. What are the dependent and independent variables of this relationship?

Dependent variable _____

Independent variable _____

b. Write an equation to represent the weight (W) for any number of cans (c).

c. Use your equation to determine how much will 10 cans weigh (in ounces).

74. In Katya's car, the number of miles driven is proportional to the number of gallons of gas used. Find the missing value in the table.

The Number of Gallons	The Number of Miles Driven
0	0
4	112
6	168
	224
10	280

a. Write an equation that will relate the number of miles driven to the number of gallons of gas.

b. What is the constant of proportionality?

c. How many miles could Katya go if she filled her 22-gallon tank?

d. If Katya takes a trip of 600 miles, how many gallons of gas would be needed to make the trip?

e. If Katya drives 224 miles during one week of commuting to school and work, how many gallons of gas would she use?

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