Name _____ Date _____ Pd_____

WS "Stilwell Practice 6-1"

Write each ratio in three *different* ways. Write your answer in simplest form.

1)  triangles to total	2)  circles to triangles
3)  all figures to circle	4)  triangles to squares
5)  triangles to circles	6)  triangles to circles
7)  square to all figures	8)  all figures to squares
9)  squares to total	10)  total to squares
11)  circles to total	12)  circle to triangles
13)  all figures to triangle	14)  square to circles
15)  triangle to circles	16)  triangles to squares
17)  all figures to circles	18)  circles to all figures
19)  total to triangles	20)  triangles to squares

NAME _____ DATE _____ PERIOD ____

6-1 Skills Practice

Ratios

Write each ratio in simplest form.

1. 14 to 6

2. 18:3

3. 4:22

4. 7:21

5. 18:12

6. 20 to 9

7. 25 to 20

8. 4:10

9. 18:21

10. 84 to 16

11. 33 ounces to 11 ounces

12. 45 minutes:25 minutes

13. 77 cups:49 cups

14. 15 pounds to 39 pounds

15. 40 seconds to 60 seconds

16. 140 centimeters to 300 centimeters

17. 9 weeks: 15 weeks

18. 3 yards to 33 yards

Determine whether the ratios are equivalent. Explain.

19. $\frac{3}{16}$ and $\frac{9}{48}$

20. $\frac{7}{10}$ and $\frac{8}{11}$

21. 18 in.:3 ft and 12 in.:2 ft

22. 6 mos:2 yr and 8 mos:3 yr

NAME _____ DATE _____ PERIOD ____

6-1 Practice

Ratios

SURVEY For Exercises 1–3, use the responses to a survey to write each ratio as a fraction in simplest form.

Survey Responses		
Yes	No	Not Sure
18	4	6

1. *yes* responses: *no* responses

2. *no* responses: *not sure* responses

3. *not sure* responses: total responses

COUNTY FAIR For Exercises 4–9, use the following information to write each ratio as a fraction in simplest form.

At its annual fair, Westborough County had 27 food booths and 63 game booths. A total of 1,350 adults and 3,600 children attended. The fair made a profit of $42,000. Of this money, $12,600 came from food sales.

4. adults:children

5. game booths:food booths

6. booths:profits

7. children:people

8. children:booths

9. non-food sale profits:profits

Determine whether the ratios are equivalent. Explain.

10. 18 trucks to 4 cars, 21 trucks to 6 cars

11. $6 for every 10 people, $9 for every 15 people

12. 33 dinners to 6 packages, 14 dinners to 4 packages

13. **ENGINES** A four cylinder engine produces a maximum of 110 horsepower. A six cylinder engine produces a maximum of 180 horsepower. Do these engines have an equivalent horsepower-to-cylinder ratio? Justify your answer.

ANALYZE TABLES For Exercises 14 and 15, use the information in the table that shows the crop statistics for three farms.

Farm	Acres of Soybeans	Acres of Corn
A	585	225
B	2,990	1,150
C	1,120	400

14. For which two farms is the soybeans-to-corn ratio the same? Explain.

15. Which farm has the highest soybeans-to-corn ratio? Justify your answer.

NAME _____ DATE _____ PERIOD _____

6-2 Study Guide and Intervention

Rates

A ratio that compares two quantities with different kinds of units is called a **rate**. When a rate is simplified so that it has a denominator of 1 unit, it is called a **unit rate**.

Example 1 **DRIVING Alita drove her car 78 miles and used 3 gallons of gas. What is the car's gas mileage in miles per gallon?**

Write the rate as a fraction. Then find an equivalent rate with a denominator of 1.

$$78 \text{ miles using } 3 \text{ gallons} = \frac{78 \text{ mi}}{3 \text{ gal}}$$ Write the rate as a fraction.

$$= \frac{78 \text{ mi} \div 3}{3 \text{ gal} \div 3}$$ Divide the numerator and the denominator by 3.

$$= \frac{26 \text{ mi}}{1 \text{ gal}}$$ Simplify.

The car's gas mileage, or unit rate, is 26 miles per gallon.

Example 2 **SHOPPING Joe has two different sizes of boxes of cereal from which to choose. The 12-ounce box costs $2.54, and the 18-ounce box costs $3.50. Which box costs less per ounce?**

Find the unit price, or the cost per ounce, of each box. Divide the price by the number of ounces.

12-ounce box $2.54 \div 12$ ounces $\approx$ \$0.21 per ounce
18-ounce box $3.50 \div 18$ ounces $\approx$ \$0.19 per ounce

The 18-ounce box costs less per ounce.

Exercises

Find each unit rate.

1. 18 people in 3 vans
2. \$156 for 3 books
3. 115 miles in 2 hours
4. 8 hits in 32 games
5. 65 miles in 2.6 gallons
6. 2,500 Calories in 25 hours

Choose the better unit price.

7. \$12.96 for 3 pounds of nuts or \$21.45 for 5 pounds of nuts
8. A 32-ounce bottle of apple juice for \$2.56 or a 48-ounce bottle for \$3.84.

NAME _____ DATE _____ PERIOD ____

6-2 Skills Practice

Rates

Find each unit rate.

1. $112 in 8 hours
2. 150 miles in 6 gallons
3. 49 points in 7 games
4. 105 students in 3 classes
5. 120 problems in 5 hours
6. 3 accidents in 12 months
7. 6 eggs in 8 days
8. 8 batteries in 4 months
9. 122 patients in 4 weeks
10. 56 gallons in 14 minutes
11. $8.43 for 3 pounds
12. 378 miles in 6.3 hours
13. 25 letters in 4 days
14. $99 for 12 CDs
15. 5 breaks in 8 hours
16. 3 trips in 15 months
17. 2 pay raises in 8 years
18. 9 errors in 60 minutes
19. 15 pounds in 6 weeks
20. 9 commercials in 15 minutes
21. 8 glasses every 25 hours
22. 13 feet in 5 steps

Choose the better unit price.

23. $4.98 for 6 cans or $7.90 for 10 cans
24. $21.40 for 4 pounds of lunch meat or $15.12 for 3 pounds of lunch meat

Lesson 6-2

Name _____ Date _____ Pd_____

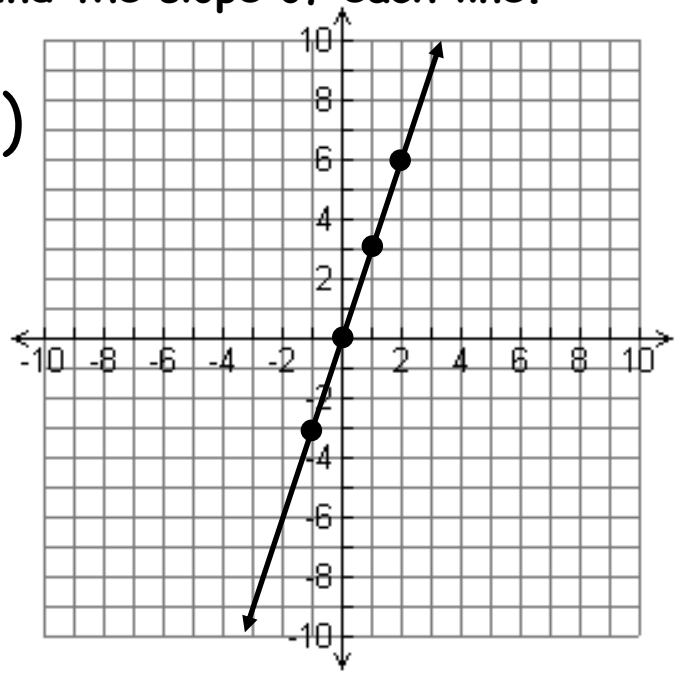
WS "Stilwell Practice 6-3"

☺ Remember:

- An ordered pair is (x, y).
- Slope is the rate of change between any two points on a line.
- Slope tells how steeps the line is. It can be positive or negative.
- The formula for slope is: $\frac{\text{change in } y}{\text{change in } x}$ or $\frac{\Delta y}{\Delta x}$

Find the slope of each line.

1)



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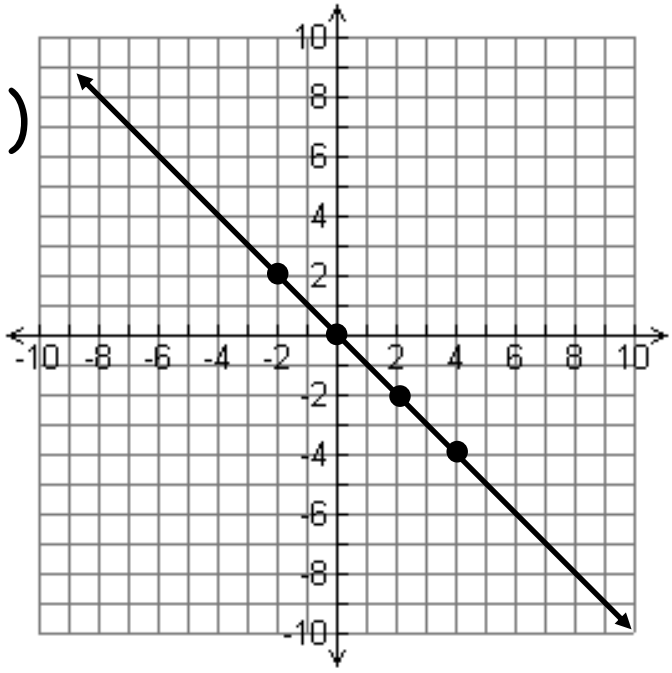

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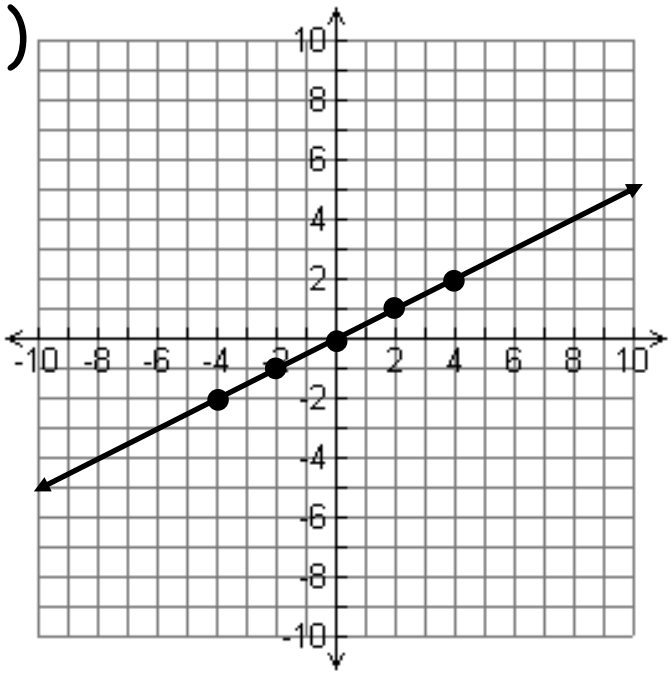

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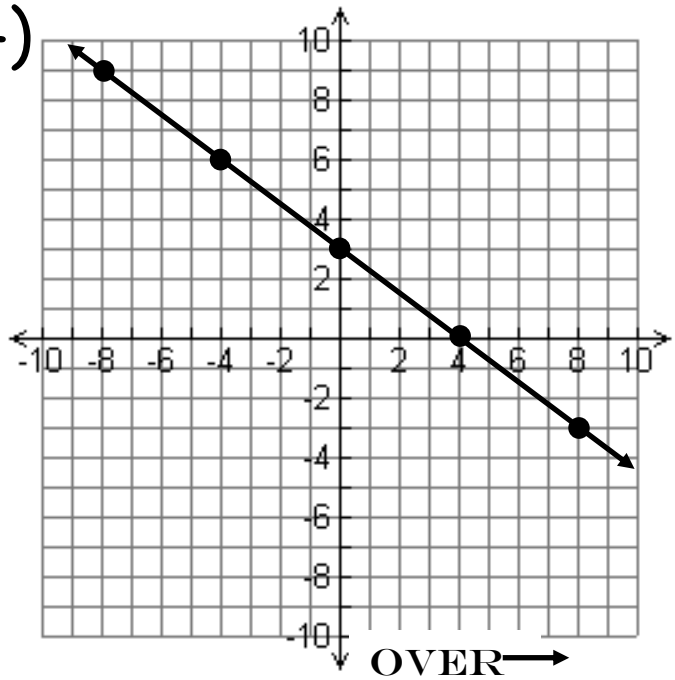

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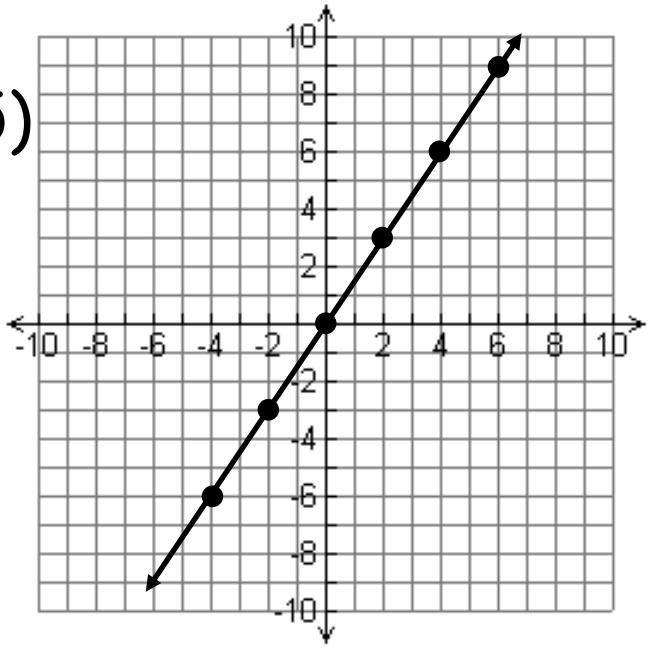

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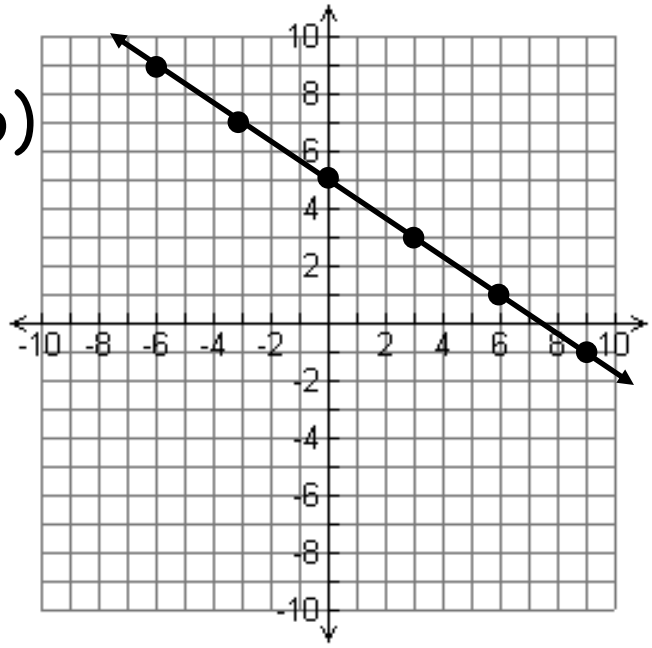

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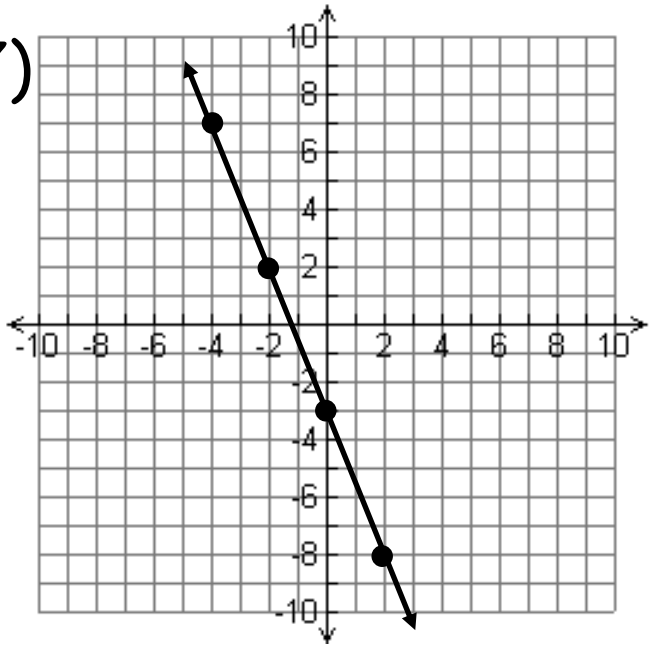

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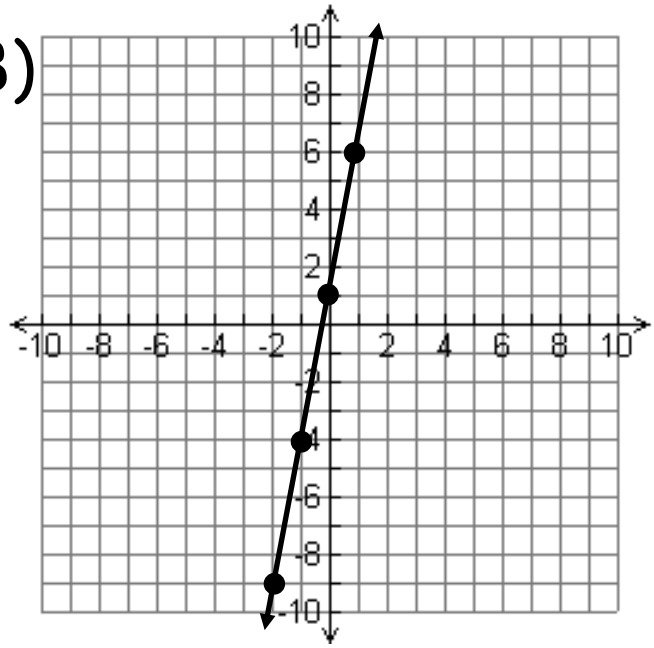

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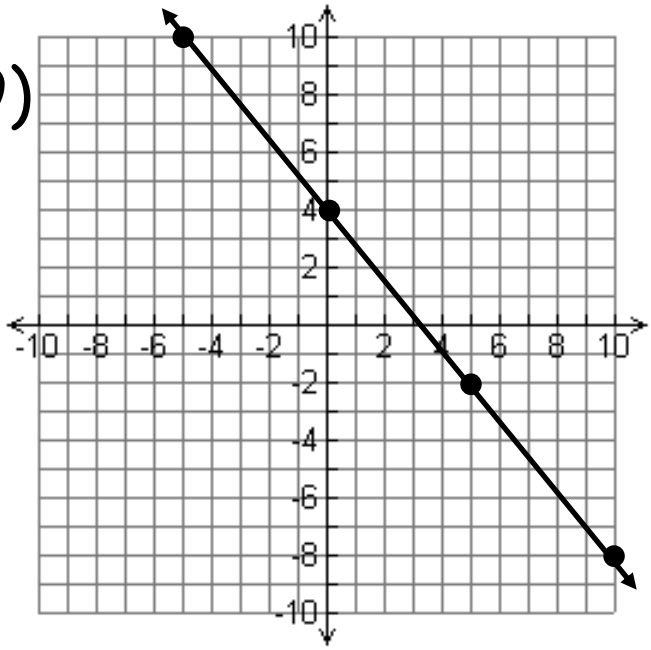

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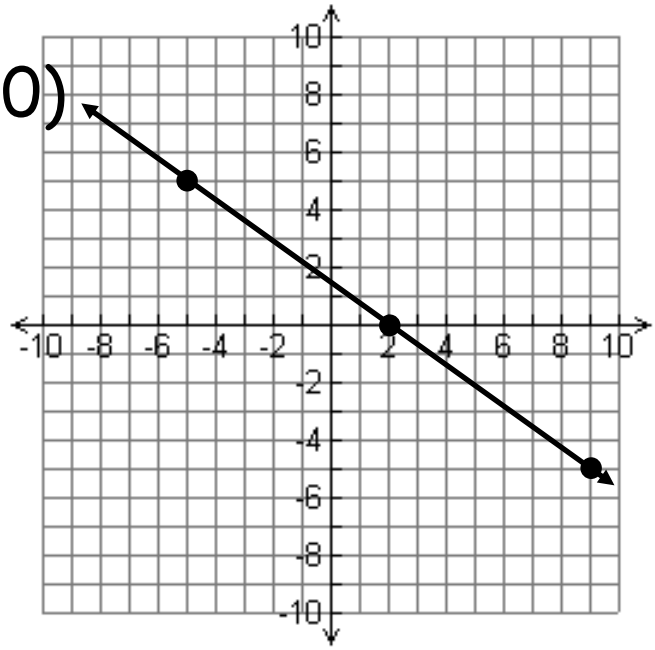


NAME _____ DATE _____ PERIOD ____

6-3 Skills Practice

Rate of Change and Slope

Find the rate of change for each table.

1.

Time spent Mowing (in hours)	Money Earned (in dollars)
1	10
3	30
5	50
7	70

2.

Time (in hours)	Temperature (in degrees)
9:00	60
10:00	62
11:00	64
12:00	66

3.

Number of Students	Number of Magazines Sold
10	100
15	150
20	200
25	250

4.

Number of Trees	Number of Apples
5	100
10	200
15	300
20	400

5.

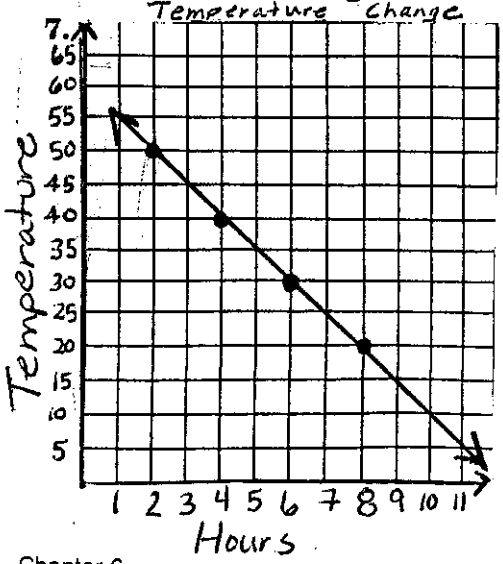
Number of Volunteers	Number of Hours Logged
5	10
10	20
15	30
20	40

6.

Length of Poster in ft	Ribbon Needed in inches
3	18
6	36
9	54
12	72

Find the rate of change for each graph.

7.



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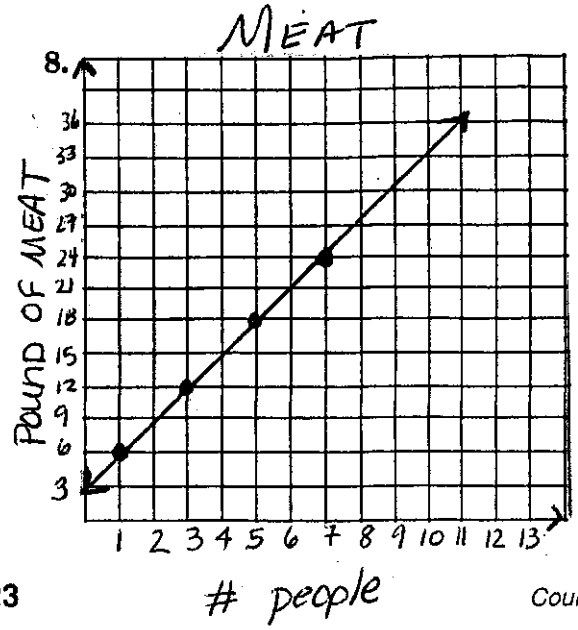

Lesson 6–3

NAME _____ DATE _____ PERIOD ____

6-6 Study Guide and Intervention

Algebra: Solving Proportions

A **proportion** is an equation stating that two ratios are equivalent. Since rates are types of ratios, they can also form proportions. In a proportion, a **cross product** is the product of the numerator of one ratio and the denominator of the other ratio.

Example 1 **Determine whether $\frac{2}{3}$ and $\frac{10}{15}$ form a proportion.**

$\frac{2}{3} \stackrel{?}{=} \frac{10}{15}$ Write a proportion.

$2 \times 15 \stackrel{?}{=} 3 \times 10$ Find the cross products.

$30 = 30$ ✓ Multiply.

The cross products are equal, so the ratios form a proportion.

Example 2 **Solve $\frac{8}{a} = \frac{10}{15}$.**

$\frac{8}{a} = \frac{10}{15}$ Write the proportion.

$8 \times 15 = a \times 10$ Find the cross products.

$120 = 10a$ Multiply.

$\frac{120}{10} = \frac{10a}{10}$ Divide each side by 10.

$12 = a$ Simplify.

The solution is 12.

Exercises

Determine if the quantities in each pair of ratios are proportional. Explain.

1. $\frac{8}{10} = \frac{4}{5}$

2. $\frac{9}{4} = \frac{11}{6}$

3. $\frac{6}{14} = \frac{9}{21}$

4. $\frac{15}{12} = \frac{9}{6}$

5. $\frac{\$2.48}{4 \text{ oz}} = \frac{\$3.72}{6 \text{ oz}}$

6. $\frac{125 \text{ mi}}{5.7 \text{ gal}} = \frac{120 \text{ mi}}{5.6 \text{ gal}}$

Solve each proportion. Show your steps/work for # 7-10 on back

7. $\frac{y}{7} = \frac{16}{28}$

8. $\frac{5}{15} = \frac{15}{w}$

9. $\frac{20}{b} = \frac{70}{28}$

10. $\frac{52}{8} = \frac{m}{9}$

7

$\frac{y}{7} = \frac{16}{28}$

8

$\frac{5}{15} = \frac{15}{w}$

9

$\frac{20}{b} = \frac{70}{28}$

10

$\frac{52}{8} = \frac{m}{9}$

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WS "Stilwell Skills Practice 6-6"

Determine if the quantities in each pair of ratios are proportional.

1) $\frac{9}{5} = \frac{27}{15}$

2) $\frac{16}{10} = \frac{24}{15}$

3) $\frac{6}{18} = \frac{9}{25}$

4) $\frac{42}{63} = \frac{28}{42}$

5) $\frac{11}{8} = \frac{13}{10}$

6) $\frac{22}{33} = \frac{12}{18}$

7) $\frac{14}{17} = \frac{29}{35}$

8) $\frac{36}{22} = \frac{30}{19}$

9) $\frac{32}{48} = \frac{10}{15}$

10) $\frac{320\ m}{6\ hr} = \frac{420\ m}{8\ hr}$

11) $\frac{\$496}{8\ oz} = \frac{\$372}{6\ oz}$

12) $\frac{25\ mg}{15\ C} = \frac{100\ mg}{60\ C}$

Write the definition of proportion:

What is true for all proportions:

Solve the proportion. Show all of your steps ☺

13) $\frac{24}{13} = \frac{a}{26}$

14) $\frac{18}{x} = \frac{3}{36}$

OVER ⟶

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15) $\frac{3}{u} = \frac{5}{15}$

16) $\frac{650}{65} = \frac{z}{5}$

17) $\frac{28}{40} = \frac{7}{q}$

18) $\frac{c}{7} = \frac{10}{35}$

19) $\frac{1}{8} = \frac{18}{b}$

20) $\frac{3}{16} = \frac{18}{j}$

21) $\frac{42}{z} = \frac{7}{5}$

22) $\frac{120}{75} = \frac{8}{m}$

Name _____ Date _____ Pd_____

WS "Stilwell Practice 6-6"

On a separate piece of paper, set up a proportion and solve.
Don't forget to show your steps ☺

1a) A train traveled 720 km in 9 h. How far would it travel in 11 h?

1b) A train traveled 720 km in 9 h. How long would it take to go 1120 km?

2a) Five pounds of apples cost $3.70. How many pounds could you buy for $5.92?

2b) Five pounds of apples cost $3.70. How much would 9 pounds cost?

3a) Eight oranges cost $1.50. How much would 20 oranges cost?

3b) Eight oranges cost $1.50. How many oranges could you buy for $5.25?

4) A long-playing record revolves 100 time every 3 min. How many revolutions does it make in 2.25 min?

5) Three and a half pounds of peaches cost $1.68. How much would $2\frac{1}{2}$ lb of peaches cost?

6) A type of steel used for bicycle frames contains 5 grams of manganese in every 400 grams of steel. How much manganese would a 2200 gram bicycle frame contain?

7) A printing press can print 350 sheets in 4 min. How long would it take to print 525 sheets?

8) A pharmacist mixes 5 g of powder with 45 cm^3 of water to make a prescription medicine. How much powder should she mix with 81 cm^3 of water to make a larger amount of the same medicine?

9) A baseball team has won 8 games and lost 6. If the team continues to have the same ratio of wins to losses, how many wins will the team have after playing 21 games?

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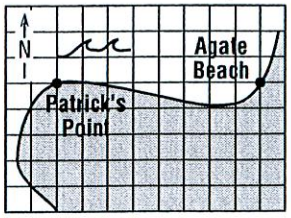
6-8 Study Guide and Intervention

Scale Drawings

A **scale drawing** represents something that is too large or too small to be drawn or built at actual size. Similarly, a **scale model** can be used to represent something that is too large or built too small for an actual-size model. The **scale** gives the relationship between the drawing/model measure and the actual measure.

Example **On this map, each grid unit represents 50 yards. Find the distance from Patrick's Point to Agate Beach.**



	Scale		Patrick's Point to Agate Beach	
map →	$\frac{1 \text{ unit}}{50 \text{ yards}}$	=	$\frac{8 \text{ units}}{x \text{ yards}}$	← map
actual →				← actual
	$1x =$		50×8	Cross products
	$x =$		400	Simplify.

It is 400 yards from Patrick's Point to Agate Beach.

Exercises

Set up a proportion to find the actual distance between each pair of cities. (Show your work ☺)

	Cities	Map Distance	Scale	Proportion	Actual Distance
1.	Los Angeles and San Diego, CA	6.35 cm	1 cm = 20 mi		
2.	Lexington and Louisville, Ky	15.6 cm	1 cm = 5 mi		
3.	Des Moines and Cedar Rapids, IA	16.2 cm	2 cm = 15 mi		
4.	Miami and Jacksonville, FL	11.73 cm	0.5 cm = 20 mi		

NAME _____ DATE _____ PERIOD ____

6-8 Skills Practice

Scale Drawings

ARCHITECTURE The scale on a set of architectural drawings for a house is $\frac{1}{2}$ inch = $1\frac{1}{2}$ feet. Set up a proportion to find the length of each part of the house. (Show your work ☺)

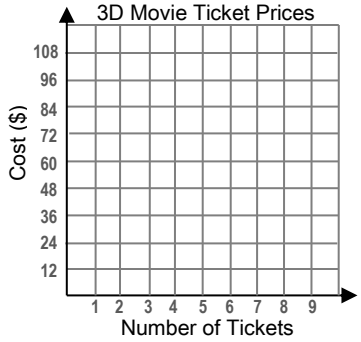
	Room	Drawing Length	Proportion	Actual Length
1.	Living Room	5 inches		
2.	Dining Room	4 inches		
3.	Kitchen	$5\frac{1}{2}$ inches		
4.	Laundry Room	$3\frac{1}{4}$ inches		
5.	Basement	10 inches		
6.	Garage	$8\frac{1}{3}$ inches		

Name _____ Date _____ Pd_____

WS "Stilwell Practice 6-Supplemental Lesson"
(Graphing Proportional Relationships)

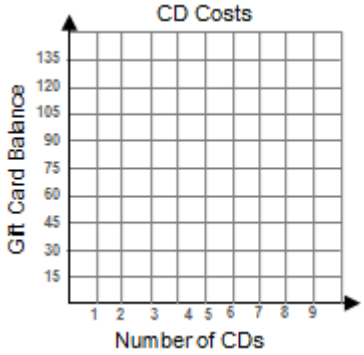
1) MOVIES The cost of 3-D movie tickets is shown in the table. Determine whether the cost is proportional to the number of tickets by graphing on the given coordinate plane. Then, explain your reasoning.

3D Movie Ticket Prices	
Number of Tickets	Cost ($)
1	12
2	24
3	30
4	48

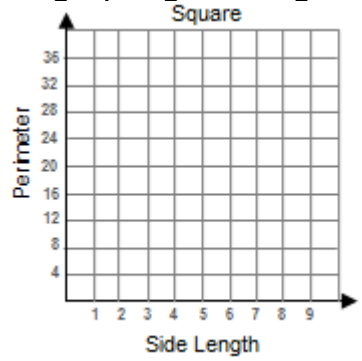


2) Refer to the graph you drew in the first problem. Explain what the points (0,0) and (1, 12) represent.

3) MUSIC Anna was given a $75 gift card to buy CDs from her favorite store. Each CD costs $15. Determine whether the remaining balance on the gift card is proportional to the number of CDs bought by graphing on the given coordinate plane. Then, explain your reasoning.

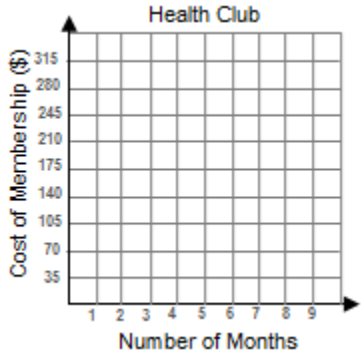


4) MEASURMENT The perimeter of a square is 4 times the length of any of its sides. Determine whether the perimeter of the square is proportional to the side length by graphing on the given coordinate plane. Then, explain your reasoning.



OVER

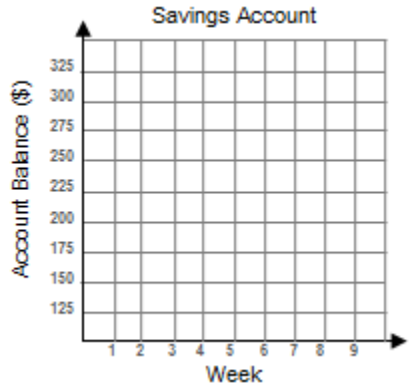
5) FITNESS A health club charges $35 a month for membership fees. Determine whether the cost of membership is proportional to the number of months by graphing.



Determine whether the relationship between the two quantities show in each table are proportional be graphing on the given coordinate plane. Then, explain your reasoning.

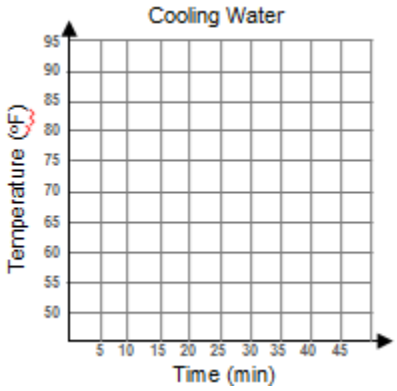
6)

Savings Account	
Week	Account Balance ($)
1	125
2	150
3	175
4	200



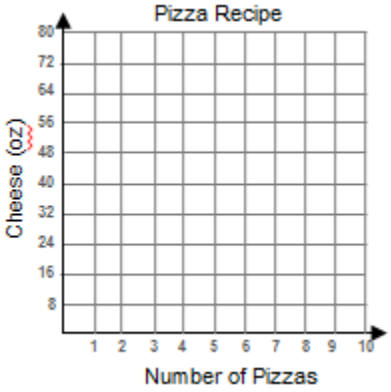
7)

Cooling Water	
Time (min)	Temperature (°F)
5	95
10	90
15	85
20	80



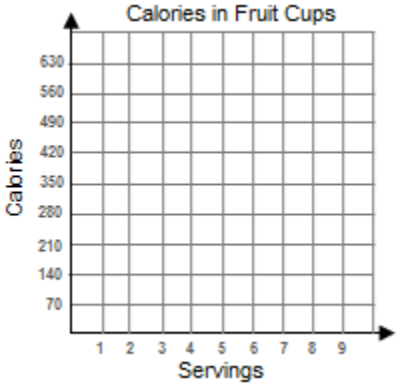
8)

Pizza Recipe	
Number of Pizzas	Cheese (oz)
1	8
4	32
7	56
10	80



9)

Calories in Fruit Cups	
Servings	Calories
1	140
3	280
5	420
7	560



Chapter 6: Ratios, Rates & Proportions

Bringing It All Together #1

Vocabulary Check

Word Bank		
rate	unit rate	slope
proportion	ratio	equivalent ratios

Choose the term from the word bank that best matches each phrase.

1) A comparison of 2 quantities _____

2) Two ratios that have the same value _____

3) A ratio of two measurements with different units _____

4) An equation that shows that two ratios or rates are equivalent _____

5) The constant rate of change in y with respect to the constant change in x ___

6) A rate that is simplified so that it has a denominator of 1 _____

6-1 Ratios (p. 282-286)

Write each ratio as a fraction in simplest form.

7) 16 dogs : 12 cats

8) 5 ft to 25 ft

9) 50 boys to 75 girls

10) 36 ft : 6 ft

Determine whether the ratios are equivalent (Yes/No). Explain.

11) 18 out of 24 and 5 out of 20 _____

12) 20 robins to 8 cardinals and 34 robins to 10 cardinals _____

13) $4 for every 16 oz and $10 for every 40 oz _____

OVER

6-2 Rates (p. 287-292)

Find each unit rate.

14) 810 miles in 9 days _____

15) 1,680 kilobytes in 4 minutes _____

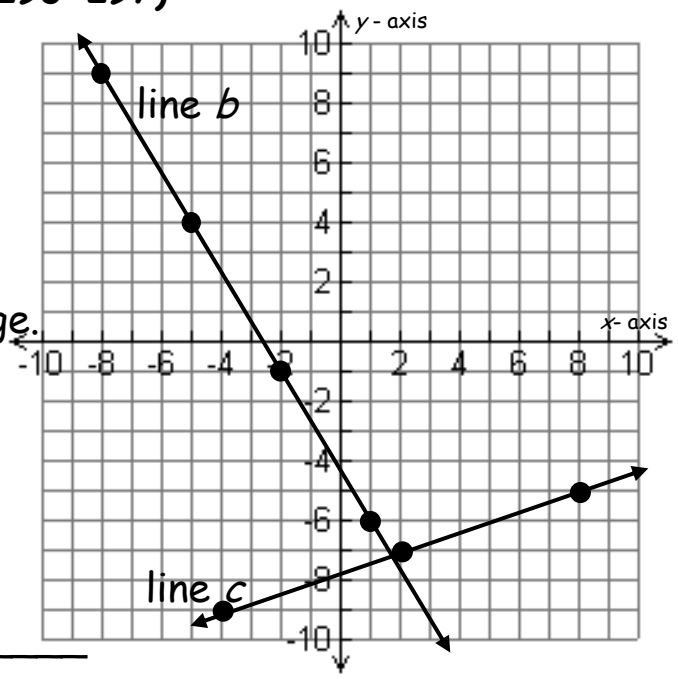
16) 45.5 meters in 13 seconds _____

6-3 Rate of Change and Slope (p. 293-297)

Complete.

17) Find the slope of line *b*. _____

18) Find the slope of line *c*. _____



19) Use the table to find the rate of change.

Time (s)	Distance (m)
0	6
1	12
2	18
3	24

_____

20) The number of minutes included in different cell phone plans and the costs are shown in the table below.
What is the rate of change in cost per minute?

Cost ($)	38	50	62	74	86
Minutes	1,000	1,400	1,800	2,200	2,600

_____

OVER →

6-6 Algebra: Solving Proportions (p. 310-315)

Solve each proportion. Show your work!

21) $\frac{x}{10} = \frac{3}{5}$

22) $\frac{4}{9} = \frac{24}{m}$

23) $\frac{2}{t} = \frac{8}{50}$

24) $\frac{15}{w} = \frac{35}{21}$

Set up and solve a proportion for each problem. Show your work ☺

25) A car traveled 360 miles in 12 hrs. How far would it travel in 9 hrs?

26) A car traveled 360 miles in 12 hrs. How long would it take to go 660 mi?

6-8 Scale Drawings (p. 320-325)

Set up a proportion to find the actual measurement of a rectangular pool that has a scale of $\frac{1}{4}$ inch = 2 ft. Show your work ☺

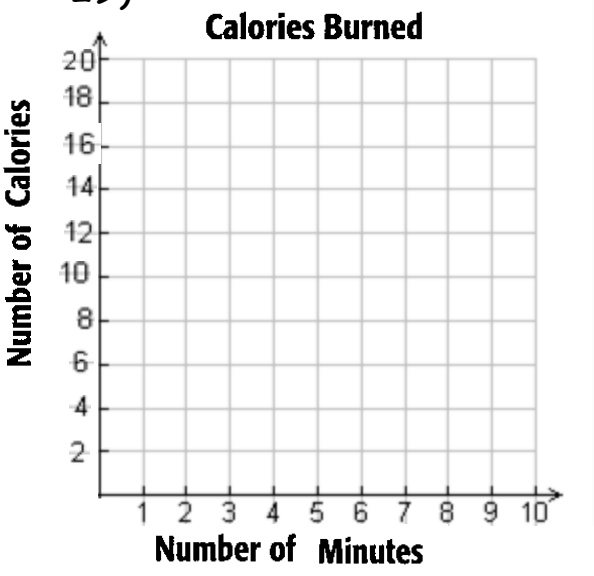
	Pool side	Drawing Length	Proportion	Actual Measurement
27)	Length	4 inches		
28)	Width	$1\frac{1}{2}$ inches		

6-Supplemental Lesson Graphing Proportional Relationships

The table shows the number of Calories an athlete burned per minute of exercise. Determine whether the number of Calories burned is proportion to the number of minutes by graphing on the provided coordinate plane. Then, explain your reasoning.

Calories Burned	
Number of Minutes	Number of Calories
1	4
2	8
3	13
4	18

29)



FINALLY DONE

Name:_____ Date:_____ Period:_____

Chapter 6: Ratios, Rates & Proportions

Bringing It All Together #2

Write each ratio as a fraction in simplest form.

1) 45: 15

2) 21 horses to 93 cows

3) 45 min to 2 hrs

4) 10 ft : 8 yds

Determine whether the ratios are equivalent (Yes/No). Explain.

5) 12 : 18 and 9 : 6

6) 10 tables to 14 chairs and 25 tables to 30 chairs

7) 6 boys to 13 girls and 30 boys to 65 girls

Find each unit rate.

8) 236 gallons for 4 minutes

9) $10.80 for 18 pounds

10) 232 people in 8 classrooms

Determine each unit rate. Show your work ☺ Then, circle the better buy.

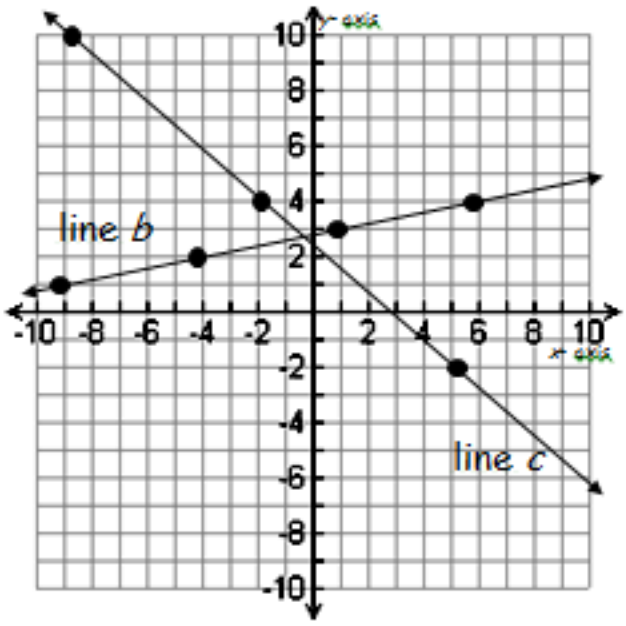
11) $4.98 for 6 cans OR $7.92 for 9 cans

OVER⟶

Complete.

12) Find the slope of line *b*. _____

13) Find the slope of line *c*. _____



14) Use the table to find the rate of change.

Time (in hours)	Temperature (in degrees)
5:00	55
7:00	65
9:00	75

_____

15) Use the table to find the rate of change.

Driveways shoveled	3	6	9	12	15
Money earned ($)	36	54	72	90	108

_____

Solve each proportion. Show your work ☺

16) $\frac{n}{64} = \frac{7}{8}$

17) $\frac{8}{k} = \frac{6}{12}$

18) $\frac{6}{9} = \frac{16}{d}$

19) $\frac{7}{21} = \frac{y}{100}$

OVER ⟶

Set up and solve a proportion for each problem.
Show your work ☺ (Don't forget your labels!)

20) A gallon of gas costs $1.24. How much would 9.25 gallons cost?

21) A candy bar costs $0.23. How many candy bars can be bought with $86.25?

GEOMETRY The scale on a map is 1 cm = 25 km. Set up a proportion to find the actual distance between each pair of cities. (Show your work ☺)

	Cities	Map Distance	Proportion	Actual Distance
22)	Carlsbad, NM to Artensia, NM	2 cm		
23)	Hobbs, NM to Eunice, NM	1 cm		

ANIMALS The slowest mammal on Earth is the tree sloth. Its rate of movement in feet per minute is shown in the table. Determine whether the number of feet the sloth moves is proportional to the number of minutes it moves by graphing on the provided coordinate plane. Then, explain your reasoning.

Time (min)	0	1	2	3	4
Distance (ft)	0	6	12	18	24

24)