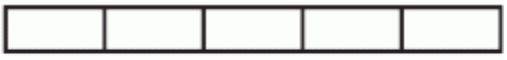
Pg. 194-195 #2, 5-19 odd, 20, 23, 25, 27, 29

2. no; The order of the quantities is important. Two apples for every 3 oranges is *not* the same as 3 apples for every 2 oranges.

5. Seats



Fans

7. 6 to 4, or 6 : 4; For every 6 basketballs, there are 4 soccer balls.

9. 3 to 7, or 3 : 7; For every 3 shirts, there are 7 pants.

11. 8 to 15, or 8 : 15; 8 out of 15 movies are comedies.

13. 15 to 3, or 15 : 3; Out of 15 movies, 3 are dramas.

15. 9 h

17. 12 : 16

19. 6 black pieces; The ratio of black to red is 3 : 5, so each part is $16 \div 8 = 2$. So, there are $3 \cdot 2 = 6$ black pieces and $5 \cdot 2 = 10$ red pieces.

20. 8; The ratio of boys to girls is 5 : 7, so each part is $48 \div 12 = 4$. So, there are $5 \cdot 4 = 20$ boys and $7 \cdot 4 = 28$ girls.

23. 4 pints of soda water, 8 pints of fruit punch concentrate, 20 pints of ginger ale; Yes; *Sample answer:* There is twice as much fruit punch as soda water (as in the original ratio). There is 5 times as much ginger ale as soda water (as in the original ratio).

25. 4.6

27. 2.53

29. B

Pg. 201-203 #5-25 odd AND
Pg. 208-209 #1, 2, 5-10, 12, 15-21 odd, 24

5. The ratio of ladybugs to bees can be described by 12 : 4, 6 : 2, or 3 : 1.

7.

Violins	8	24
Cellos	3	9

8 : 3 and 24 : 9

9.

Burgers	3	6	9
Hot dogs	5	10	15

3 : 5, 6 : 10, and 9 : 15

11.

Forks	16	8	48
Spoons	10	5	30

16 : 10, 8 : 5, and 48 : 30

13.

You	3	6	9	12
Friend	4	8	12	16

16 tickets

15.

First	100	10	60
Second	60	6	36

$60

17. Adding the same number, 5 in this case, to each part of the ratio does not create equivalent ratios. You can add corresponding parts of equivalent ratios to create new equivalent ratios.

Sample answer:

A	3	6	9
B	7	14	21

19. 28 basketballs

21. Add the corresponding quantities of Recipes B and D to create Recipe E.

23. Subtract the corresponding quantities of Recipe B from Recipe C to create Recipe A.

25. *Sample answer:* Add the corresponding quantities of Recipes B and F to create a batch with 11 servings.

1. *Sample answer:* You walk at a rate of 2 blocks per minute, so you walk 12 blocks in 6 minutes.

2. What is the cost per dozen bagels?; $15; $1.25

5. *Sample answer:* 4 inches for every 12 years

6. *Sample answer:* 150 gallons for every 25 seconds

7. $7 per week

8. 6 necklaces per hour

9. 45 miles per hour

10. 19 students per class

12. 110 calories per serving

15. 100 times per second

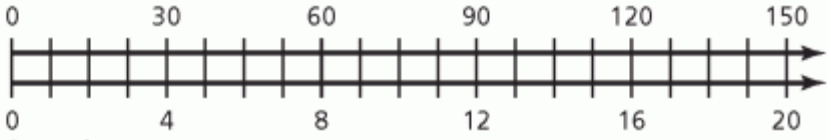
17. $20

19. equivalent

21. not equivalent

24. a. $112.50

b.



$120

Pg. 214-215 #3-11 all, 15, 19-22

3. A
4. A
5. B
6. A
7. A
8. B
9. B
10. B
11. the first recipe
15. See *Taking Math Deeper.*
19. 16
20. 18 R26
21. 34 R109

Pg. 217 #1-13 all

1. 3 to 2, or 3 : 2; For every 3 tulips, there are 2 lilies.
2. 8 to 4, or 8 : 4; For every 8 crayons, there are 4 markers.
3.

Shoes	7	28	49
Boots	2	4	14

   7 : 2, 28 : 4, and 49 : 14
4.

Trains	3	12	18
Airplanes	8	32	48

   3 : 8, 12 : 32, and 18 : 48
5. *Sample answer:* 20 liters for every 6 minutes
6. *Sample answer:* 15 tickets for every 60 points
7. 2 touchdowns per game
8. 3 text messages per minute
9. 20 entries per contest
10. 3 questions per minute
11. $60
12. 24-fluid-ounce shampoo; *Sample answer:* Because $0.20 is less than $0.22, the 24-fluid-ounce shampoo is the better buy.

13. **a.** 17 to 16, or 17 : 16; For every 17 Celtics championships, there are 16 Lakers championships.

b. 3 to 4, or 3 : 4; For every 3 Pistons championships, there are 4 Spurs championships.

c. 6 to 16, or 6 : 16; For every 6 Bulls championships, there are 16 Lakers championships.

Pg. 610- 611 #2, 5-21 odd, 26, 29, 31 *23

2. Compare the ratios in simplest form and compare the cross products.

5. yes

7. no

9. yes

11. no

13. no

15. yes

17. no

19. yes

21. yes; Both can do 45 sit-ups per minute.

26. **a.** $7 per hour

b. $9 per hour

c. no; Your friend earns more money per hour.

29. See *Taking Math Deeper*.

31. no; The ratios are not equivalent; $\frac{13}{19} \neq \frac{14}{20} \neq \frac{15}{21}$ etc.

23. yes

Pg. 618-619 #2, 4-6, 9-21 odd, 22, 25

2. Find the number that when multiplied by 5 is 15.

4. $\frac{x}{50} = \frac{40}{100}$

5. $\frac{x}{50} = \frac{78}{100}$

6. $\frac{x}{80} = \frac{80}{100}$

9. $\frac{n \text{ winners}}{85 \text{ entries}} = \frac{34 \text{ winners}}{170 \text{ entries}}$

11. $\frac{100 \text{ meters}}{x \text{ seconds}} = \frac{200 \text{ meters}}{22.4 \text{ seconds}}$

13. $\frac{\$24}{3 \text{ shirts}} = \frac{c}{7 \text{ shirts}}$

15. $\frac{5 \text{ 7th grade swimmers}}{16 \text{ swimmers}} = \frac{s \text{ 7th grade swimmers}}{80 \text{ swimmers}}$

17. $y = 16$

19. $c = 24$

21. $g = 14$

22. a. $\frac{1 \text{ trombone}}{3 \text{ violas}} = \frac{t \text{ trombones}}{9 \text{ violas}}$

b. 3 trombones

25. See *Taking Math Deeper*.

Pg. 626-627 #1, 2, 5-23 odd, 32, 36

1. mental math; Multiplication Property of Equality; Cross Products Property
2. *Sample answer:* mental math; Because $3 \cdot 2 = 6$, the product of x and 2 is 14. So, $x = 7$.
5. $h = 80$
7. $n = 15$
9. $y = 7\frac{1}{3}$
11. $k = 5.6$
13. $n = 10$
15. $d = 5.76$
17. $m = 20$
19. $d = 15$
21. $k = 5.4$
23. 108 pens
32. $769.50
36. See *Taking Math Deeper.*

Pg. 638-639 #7-23 odd, 27, 29, 34, *26

7. no; The line does not pass through the origin.

9. yes; The line passes through the origin; $k = \frac{2}{3}$

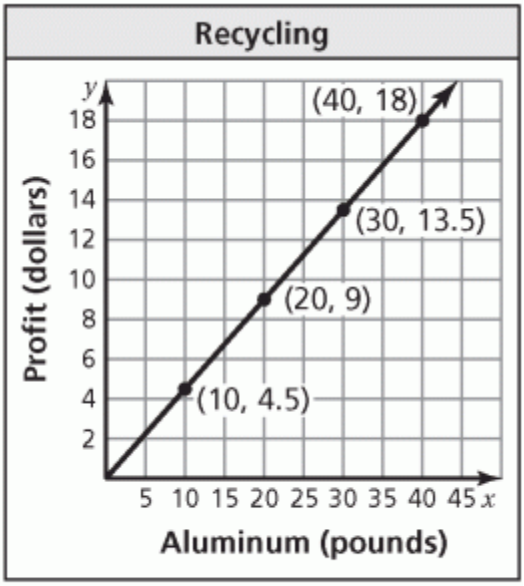
11. yes; The equation can be written as $y = kx$; $k = \frac{5}{2}$

13. no; The equation cannot be written as $y = kx$.

15. yes; The equation can be written as $y = kx$; $k = \frac{1}{2}$

17. no; The equation cannot be written as $y = kx$.

19.



yes; $y = 0.45x$

21. $k = \frac{5}{3}$; $y = \frac{5}{3}x$

23. $y = 2.54x$

27. no

29. Every graph of direct variation is a line; however, not all lines show direct variation because the line must pass through the origin.

34. D

Name Answers Date 2017-2018

Unit 4 Study Guide

Section 14.1 - Ratios & Rates

Write the ratio as a fraction in simplest form.

1) 35 to 63 $\frac{35}{63} = \boxed{\frac{5}{9}}$

2) 108 seconds : 36 feet $\frac{108\text{ sec}}{36\text{ ft}} = \boxed{\frac{3\text{ sec}}{1\text{ ft}}}$

3) 198 women to 110 men $\frac{198\text{ w}}{110\text{ m}} = \boxed{\frac{9\text{ women}}{5\text{ men}}}$

4) 1000 songs : 2 megabytes $\frac{1000\text{ s}}{2\text{ mb}} = \boxed{\frac{500\text{ songs}}{1\text{ mb}}}$

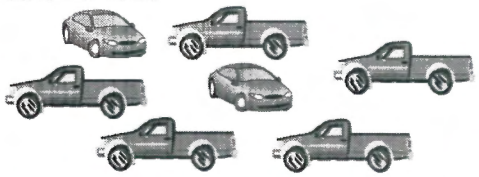
Write the ratio in two ways. Explain what the ratio means.

5) flies to lizards

$\frac{2\text{ f}}{3\text{ liz.}}$ 2f:3liz

For every 2 flies, there are 3 lizards

6) cars : trucks



$\frac{2\text{c}}{5\text{t}}$ 2c:5t

For every 2 cars, there are 5 trucks

Find the unit rate.

7) \$5.40 for 24 cans

$\frac{\$5.40}{24\text{ cans}} = \frac{\$0.225}{1\text{ can}}$

$\approx \boxed{\frac{\$0.23}{1\text{ can}}}$

8) \$1.29 for 20 ounces

$\frac{\$1.29}{20\text{ oz}} = \frac{\$0.0645}{1\text{ oz}}$

$\approx \boxed{\frac{\$0.06}{1\text{ oz}}}$

9) 50 meters in 27.5 seconds

$\frac{50\text{ m}}{27.5\text{ sec}} = \boxed{\frac{1.81\text{ m}}{1\text{ sec}}}$

10) There are 16 bacteria in a beaker. Four hours later there are 228 bacteria in the beaker. What is the rate of change per hour in the number of bacteria?

$228 - 16 = 212$ bacteria

$\frac{212\text{ bacteria}}{4\text{ hours}} = \boxed{\frac{53\text{ bacteria}}{1\text{ hour}}}$

Complete the ratio table to solve the problem.

11) You baked 42 chocolate cupcakes and 28 red velvet cupcakes. You package them in boxes that have the same ratio of chocolate to red velvet as the total cupcakes. How many red velvet cupcakes are in a package?

16 cupcakes

Chocolate	Red Velvet
42	28
6	4
24	16

Section 14.2 - Proportions

Tell whether the ratios form a proportion.

12) $\frac{25}{16}, \frac{65}{56}$ (1400, 1040)

No. their cross-products are not the same.

13) $\frac{30}{75}, \frac{24}{60}$ ($\frac{2}{5}$, $\frac{2}{5}$)

Yes. They simplify to the same ratio.

14) $\frac{27}{48}, \frac{108}{192}$ ($\frac{9}{16}$, $\frac{9}{16}$)

Yes. They simplify to the same ratio.

Tell whether the ratios form a proportion. Show your work.

15) $24 for 16 burgers; $15 for 10 burgers

$\frac{\$24}{16b}$ $\frac{\$15}{10b}$ $\frac{\$3}{2b}$ $\frac{\$3}{2b}$

Yes. They simplify to the same ratio.

16) 10 used books for $4.50; 15 used books for $6.00

$\frac{\$4.50}{10b} = \frac{\$0.45}{1\ book}$ $\frac{\$6.00}{15b} = \frac{\$0.40}{1\ book}$

No. They don't have the same unit rate.

17) One mixture contains 6 fluid ounces of water and 10 fluid ounces of vinegar. A second mixture contains 9 fluid ounces of water and 12 fluid ounces of vinegar. Are the mixtures proportional? If not, how much water or vinegar would you add to the second mixture so that they are proportional?

$\frac{6w}{10v}$ $\frac{9w}{12v}$ $\frac{3w}{5v}$

They are not proportional. You would need 3 more fluid ounces of vinegar to get you an equivalent ratio of $\frac{9\ fl\ oz\ of\ water}{15\ fl\ oz\ of\ vinegar}$.

Section 14.3 - Writing Proportions

Use the table to write a proportion.

18)

	August	September
Hurricanes	2	1
Storms	6	n

$\frac{2\ h}{6\ s} = \frac{1\ h}{n}$

19)

	Day 1	Day 2
Wins	w	8
Races	21	12

$\frac{w\ win}{21\ races} = \frac{8\ wins}{12\ races}$

20) The county requires 2 teachers for every 45 students. Write a proportion that gives the number t of teachers needed for 315 students.

$\frac{2\ teachers}{45\ students} = \frac{t}{315\ students}$

$\frac{45t}{45} = \frac{630}{45}$

$t = 14$ teachers

Write and solve.

21) A paint color requires the ratio of green paint to yellow paint to be 4 : 9.

a) A container of this paint has 36 pints of yellow paint. Write a proportion that gives the number p of pints of green paint in the container.

$\frac{4}{9} = \frac{p}{36}$ $p = 16$ pints of green paint

b) How many pints of green paint are in the container?

c) How many pints of paint are in the container all together?

$16 + 36 = 52$ pints

Section 14.4 - Solving Proportions

Use either multiplication or the **Cross Products Property** to solve the proportion.

22) $\frac{16}{9} = \frac{q}{36}$ $q = 64$

23) $\frac{57}{r} = \frac{38}{18}$ $r = 27$

24) $\frac{50}{14} = \frac{w}{98}$ $w = 350$

25) Three shirts cost \$9.99. How much does it cost for 8 shirts?

$\frac{\$9.99}{3 \text{ shirts}} = \frac{x}{8 \text{ shirts}}$ $x = \$26.64$

Solve the proportion.

26) $\frac{x}{13} = \frac{64}{52}$ $x = 16$

27) $\frac{c}{24} = \frac{9}{36}$ $c = 6$

28) $\frac{30}{9} = \frac{20}{k}$ $k = 6$

29) The distance traveled (in feet) is proportional to the number of seconds. Find the values of x, y, and z.

Feet	3	x	15	z
Seconds	5	65	y	3.5

$x = 39$
$y = 25$
$z = 2.1$

Section 5.4 - Comparing & Graphing Ratios

Determine which car gets the better gas mileage.

30)

Car	A	B
Distance (miles)	510	550
Gallons used	18	20

$\frac{28.3}{1}$ $\frac{27.5}{1}$

Car A

31)

Car	A	B
Distance (miles)	460	430
Gallons used	35	32

$\approx \frac{13.1}{1}$ $\approx \frac{13.4}{1}$

Car B

Determine which is the better buy.

32)

Tissues	A	B
Cost (dollars)	4.50	3.25
Boxes	5	3

$\frac{\$0.90}{1}$ $\frac{\$1.08}{1}$

Tissue A

33)

Frozen Waffles	A	B
Cost (dollars)	2.29	3.59
Waffles	8	12

~~\$0.28~~

$\approx \frac{\$0.29}{1}$ $\approx \frac{\$0.30}{1}$

Frozen Waffle A

34) The deli offers a fruit salad with 5 blueberries for every 3 pieces of cantaloupe. The deli changes the mixture to have 6 blueberries for every 4 pieces of cantaloupe, but the number of pieces of fruit in the salad does not change.

a) Create a ratio table for each salad. How many blueberries are in the smallest possible salad?

Salad 1

Blue.	5	
Cant.	3	

Salad 2

Blue	6	3
Cant.	4	2

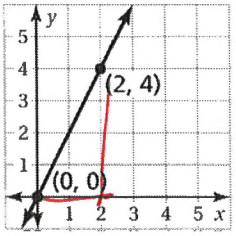
3 blueberries

b) Blueberries cost less than cantaloupe. Should the company charge more or less for the new salad? Explain your reasoning.

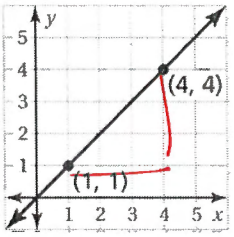
Less. Because the new mix uses a lower ratio of blueberries.

Section 14.5 - Slope

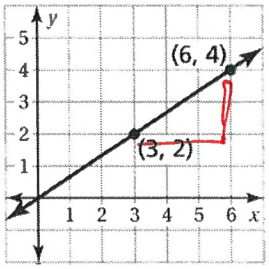
Find the slope of the line.

35) 

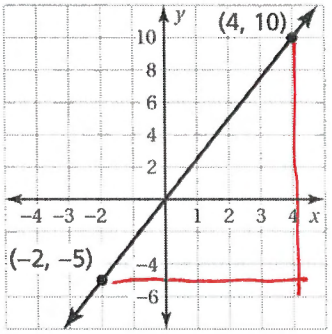
slope $= \frac{4}{2} = \frac{2}{1}$

36) 

slope $= \frac{1}{1}$

37) 

slope $= \frac{2}{3}$

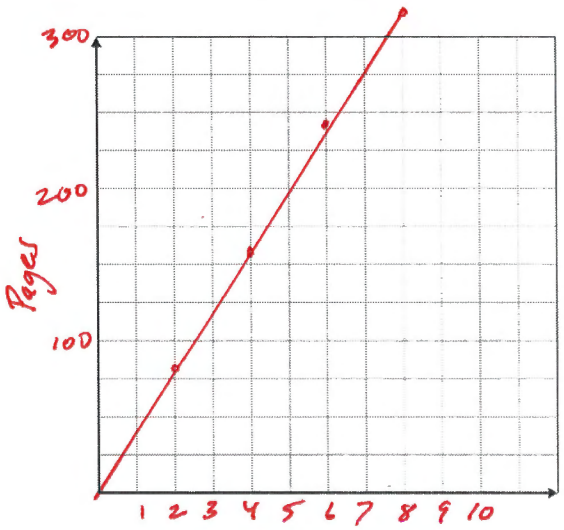
38) 

slope $= \frac{15}{6} = \frac{5}{2}$

Graph the data. Then find and interpret the slope of the line through the points.

39)

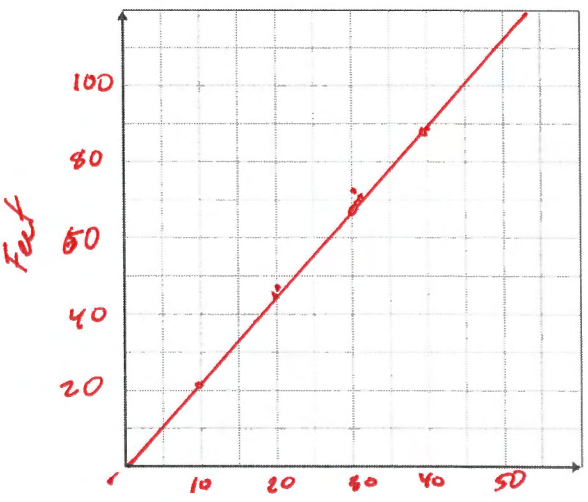
Days, x	2	4	6	8
Pages, y	80	160	240	320



For every 1 day, 40 pages.

40)

Seconds, x	10	20	30	40
Feet, y	22	44	66	88

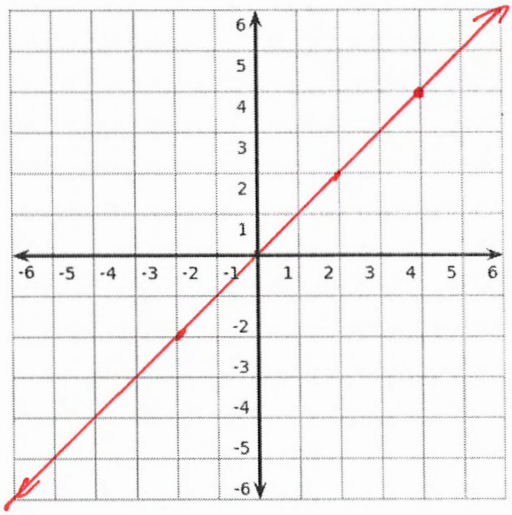


For every 1 second, it goes up 2.2 feet.

Section 14.6 - Direct Variation

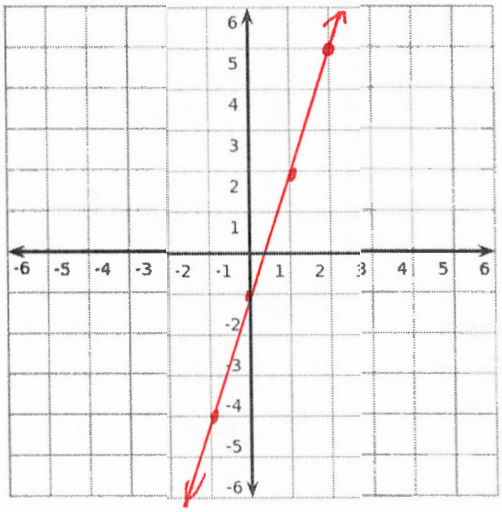
Graph the ordered pairs in a coordinate plane. Do you think that graph shows that the quantities vary directly? Explain your reasoning

41) (–2, –2), (0, 0), (2, 2), (4, 4)



Direct variation. Line goes through the origin

42) (–1, –4), (0, –1), (1, 2), (2, 5)



Tell whether x and y show direct variation. Explain your reasoning.

43)

x	–1	0	1	2
y	2	0	2	4

Yes, Line goes through the origin

44) $y - 2 = 3x - 2$

$+2 \quad +2$

$y = 3x$

Yes. It can be written as $y = kx$

45) The table shows the grams of fiber y for the grams of protein x. Graph the data. Tell whether x and y show direct variation If so, write an equation that represents the line.

Grams of protein, x	3	6	9	12
Grams of fiber, y	2	4	6	8