

Ratios & Proportions Chapter Questions

1. How are ratios simplified?
2. How are equivalent ratios written?
3. How are unit rates determined?
4. What are the two ways proportions are solved?
5. What are examples of proportions in real life?
6. What are two ways to determine if the relationship between two quantities is proportional?

Ratios, Rates & Proportions Chapter Problems

Writing Ratios

Classwork

- Write each ratio as a fraction in simplest form.
 - $9:36 =$
 - 10 to 100 =
 - $25:75 =$
 - $\frac{49}{7} =$
 - 8 out of 11 =
- There are 20 soccer players on the team. 8 are in 7th grade and the rest are in 8th grade. Write the ratios below three different ways:
 - The number of 7th graders to the number of 8th graders.
 - The number of 8th graders to the total number of players on the team.
- There are 32 slices of pizza. 10 are plain, 12 are pepperoni, and the rest are sausage.
 - What is the ratio of plain to pepperoni?
 - What is the ratio of plain to sausage?
 - What is the ratio of sausage to total slices?
 - What is the ratio of total slices to plain?

Homework

- Write each ratio as a fraction in simplest form.
 - $7:9 =$
 - 10 to 6 =
 - $1,000:10,000 =$
 - $\frac{70}{125} =$
 - 6 out of 50 =
- There are 15 students in the yearbook club. 3 are in 7th grade and the rest are in 8th grade. Write the ratios below three different ways:
 - The number of 7th graders to the number of 8th graders.
 - The number of 8th graders to the total number of members in the club.
- There are 24 hotdogs. 8 are plain, 10 have ketchup on them, and the rest have mustard.
 - What is the ratio of plain to mustard?
 - What is the ratio of plain to ketchup?
 - What is the ratio of ketchup to total hotdogs?
 - What is the ratio of total hotdogs to plain?

Equivalent Ratios

Classwork

- The following ratios are equivalent, true or false?
 - $\frac{3}{10}$ is equivalent to $\frac{6}{12}$
 - 22 to 50 is equivalent to 11:25
 - $\frac{13}{33}$ is equivalent to $\frac{23}{66}$
 - 9:6 is equivalent to 3:2
 - 3 to 5 is equivalent to 12 to 20, which is equivalent to 24 to 10
 - $\frac{24}{36}$ is equivalent to $\frac{12}{18}$ is equivalent to $\frac{4}{6}$

8. Write an equivalent ratio.

- a. $\frac{7}{9} =$
- b. 15 to 39 =
- c. 6:4 =
- d. $\frac{4}{5} =$
- e. $\frac{5}{13} =$
- f. 70 to 30 =

Homework

9. The following ratios are equivalent, true or false?

- a. $\frac{7}{12}$ is equivalent to $\frac{14}{24}$
- b. 9 to 20 is equivalent to 27:40
- c. $\frac{8}{11}$ is equivalent to $\frac{16}{22}$
- d. 40:8 is equivalent to 20:2
- e. 4 to 7 is equivalent to 8 to 14, which is equivalent to 20 to 35
- f. $\frac{50}{75}$ is equivalent to $\frac{10}{15}$ is equivalent to $\frac{5}{7}$

10. Write an equivalent ratio.

- a. $\frac{8}{13} =$
- b. 28 to 49 =
- c. 2:3 =
- d. $\frac{7}{9} =$
- e. $\frac{80}{20} =$
- f. 45 to 35 =

Rates

Classwork

- 11. At the party there was 32 slices of pizza for 16 kids. How many slices per person?
- 12. The new car can travel 400 miles on 20 gallons of gas. How many miles per gallon can the car travel?
- 13. There are 5 coaches at the field for 40 kids. How many kids per coach are there?
- 14. The recipe calls for 5 cups of sugar for every 2 eggs. How many cups of sugar are needed for one egg?
- 15. 8 cups of water evaporate in 4 days. How many cups of water evaporate per day?
- 16. Below are some sale prices for yogurt. Which offers the best price?
 - a. 15 for \$3.95
 - b. 5 for \$2.20
 - c. 20 for \$6.20
 - d. 10 for \$3.20

Homework

- 17. It costs \$46.20 for 7 pizzas. What is the cost per pizza?
- 18. There are 576 calories in 8 servings of pie. What is the number of calories per slice?

19. A discount store is having a sale on CDs. Seven CDs cost \$65.45, what is the price per CD?
20. You earn \$60 for eight hours of work. What is the hourly rate?
21. You can type 405 words in 4.5 minutes. How many words can you type in one minute?
22. Below are some sale prices for soda. Which offers the best price?
- 6 for \$1.75
 - 8 for \$1.90
 - 12 for \$3.15
 - 30 for \$7.50

Proportions

Classwork

23. Solve the proportion using equivalent ratios.

- $\frac{2}{7} = \frac{4}{x}$
- $\frac{5}{9} = \frac{x}{27}$
- $\frac{20}{11} = \frac{x}{22}$
- $\frac{36}{48} = \frac{6}{x}$
- $\frac{x}{3} = \frac{30}{45}$

24. Use cross products to solve the proportion.

- $\frac{2}{6} = \frac{5}{x}$
- $\frac{4}{6} = \frac{x}{9}$
- $\frac{5}{25} = \frac{x}{20}$
- $\frac{6}{2} = \frac{21}{x}$
- $\frac{x}{18} = \frac{6}{4}$

Homework

25. Solve the proportion using equivalent ratios.

- $\frac{2}{3} = \frac{x}{9}$
- $\frac{6}{10} = \frac{3}{x}$
- $\frac{10}{x} = \frac{15}{3}$
- $\frac{x}{3} = \frac{8}{12}$
- $\frac{12}{x} = \frac{3}{1.2}$

26. Use cross products to solve the proportion.

a. $\frac{4}{x} = \frac{3}{9}$

b. $\frac{20}{x} = \frac{16}{20}$

c. $\frac{3}{6} = \frac{7}{x}$

d. $\frac{x}{42} = \frac{25}{70}$

e. $\frac{36}{x} = \frac{27}{21}$

Direct & Indirect Relationships in Tables & Graphs

Classwork

Determine if the relationships are proportional.

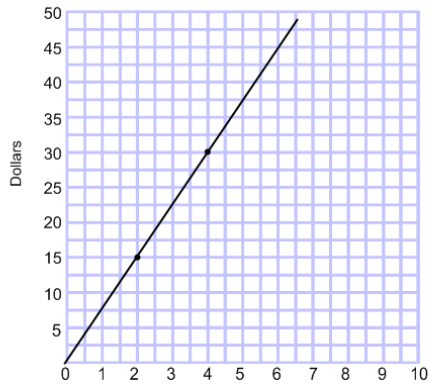
27.

X	1	2	3	4
Y	2	3	4	5

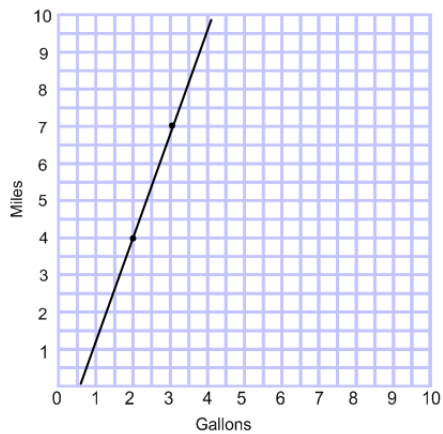
28.

X	3	4	5	7
Y	12	16	20	28

29.



30.



Homework

Determine if the relationships are proportional.

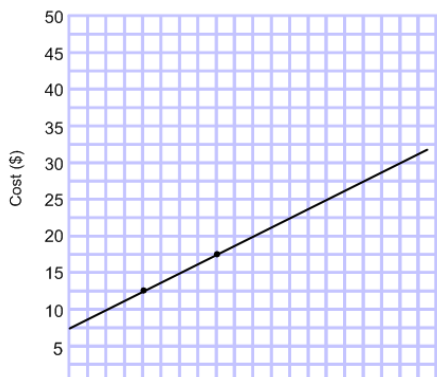
31.

X	1	3	5	7
Y	3	9	15	21

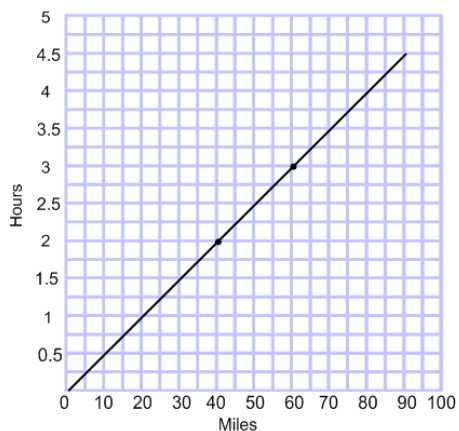
32.

X	3	5	7	9
Y	12	20	21	36

33.



34.



Constant of Proportionality

Classwork

Find the Constant of Proportionality.

35.

X	7.5	10	17.5	20
Y	4.5	6	10.5	12

36.

X	1.5	2	3.5	5
Y	10.5	14	24.5	35

37.

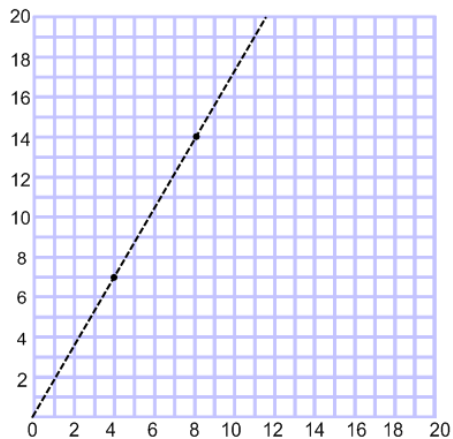
X	2	4	5	7
Y	1	2	2.5	3.5

38. $y = 3.8x$

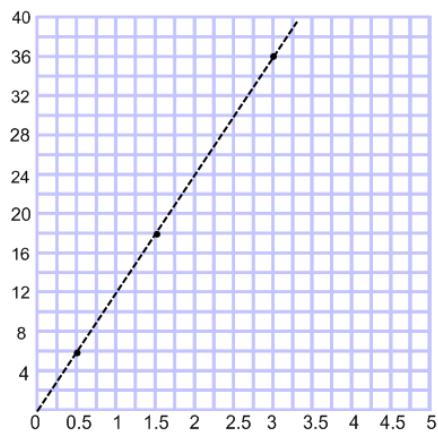
39. $y = 7x$

40. $y = \frac{2}{3}x$

41.



42.



Homework

Find the Constant of Proportionality.

43.

X	2	3	5	6
Y	6	9	15	18

44.

X	2	4	7	9
Y	0.4	0.8	1.4	1.8

45.

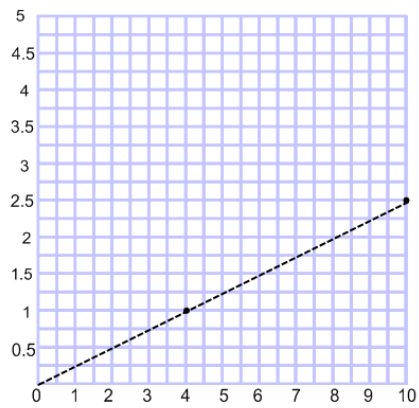
X	1.5	3	4.5	12
Y	1	2	3	8

46. $y = 7.25x$

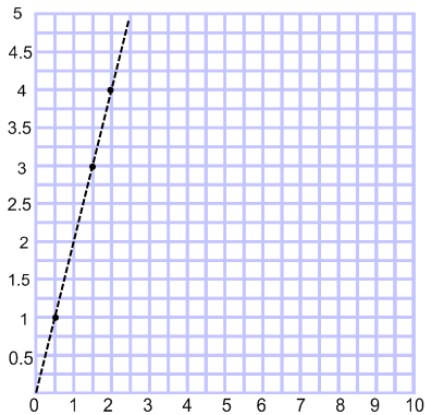
47. $y = 4x$

48. $y = \frac{7}{8}x$

49.



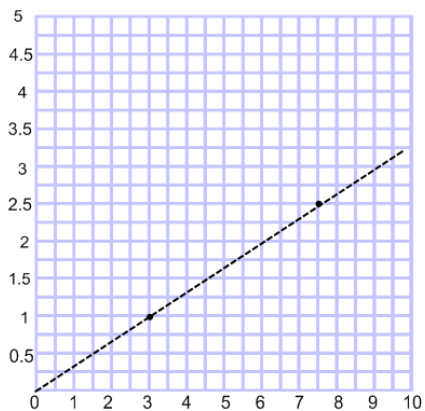
50.



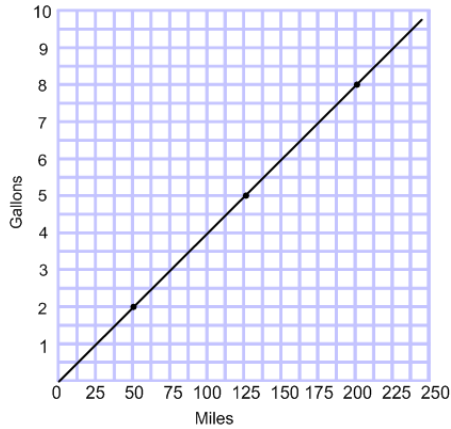
Writing Equations for Proportions

Classwork

51. Write the equation that represents the total cost of apples (a) for \$1.25 a pound (p).
52. Jon drove 192 miles (m) on 6 gallons of gas (g). What is the equation that represents the proportional relationship?
53. Jose is purchasing coffee for the school store. The total cost (c) is \$104.85 for 15 pounds (p). What is the equation that represents the proportional relationship?
54. Use the graph below to write an equation to represent the proportional relationship.



55. Use the graph below to write an equation to represent the proportional relationship.



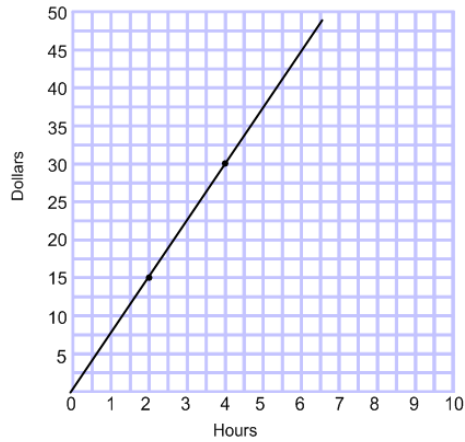
Homework

56. Write the equation that represents the total paycheck (p) for \$7.25 an hour (h).

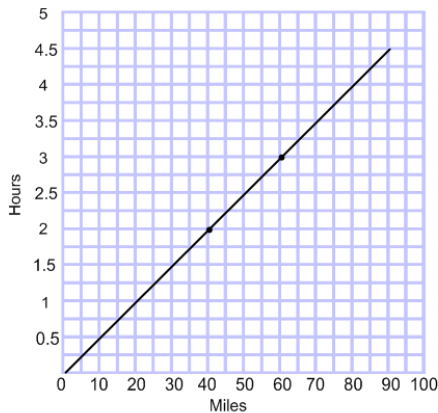
57. Kitana purchased shirts for the math club. The total cost (c) is \$275 for 25 shirts (s). What is the equation that represents the proportional relationship?

58. Franklin filled his gas tank. The total cost (c) was \$56.70 for 18 gallons (g). What is the equation that represents the proportional relationship?

59. Use the graph below to write an equation to represent the proportional relationship.



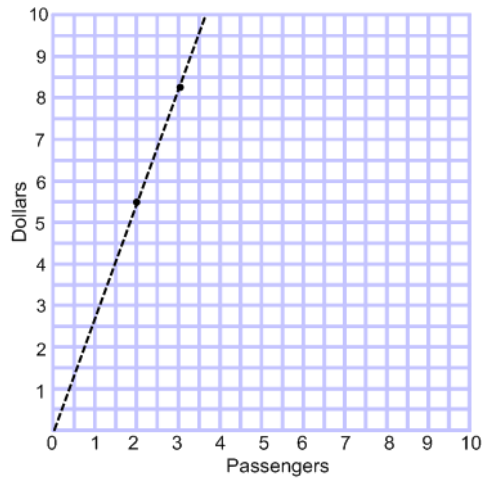
60. Use the graph below to write an equation to represent the proportional relationship.



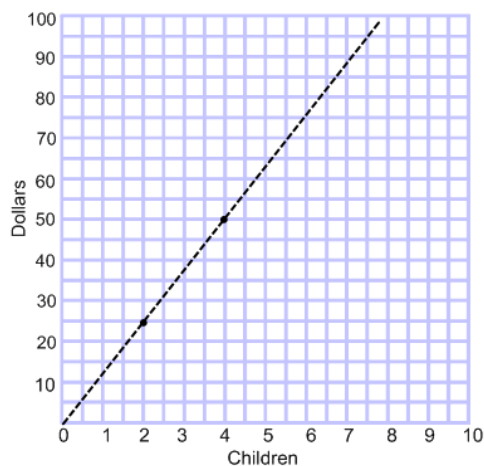
Understanding Graphs of Proportions

Classwork

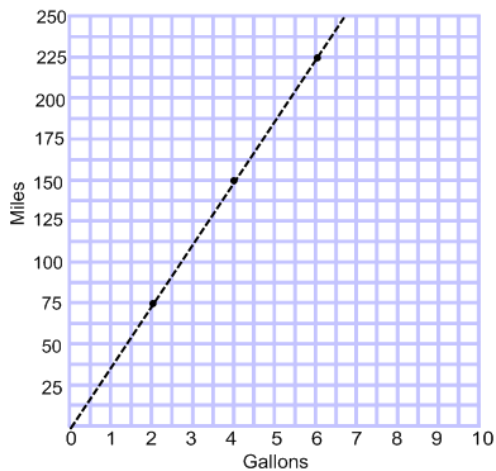
61. The Light Rail Line in New Jersey charges passengers for one way rides. Use the graph below to determine the charge per ride.



62. Paula babysits and charges per child. Use the graph to determine how much she earns per child.

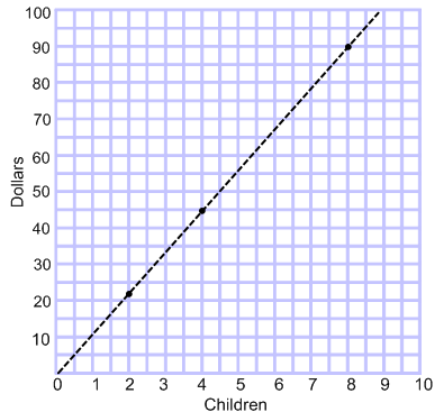


63. Bob drives to work each day. His gas mileage is shown in the graph. What is the unit rate? What does it represent?

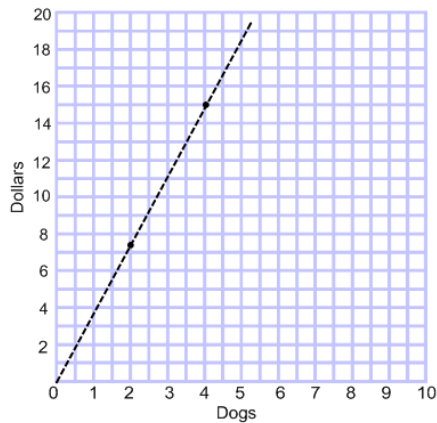


Homework

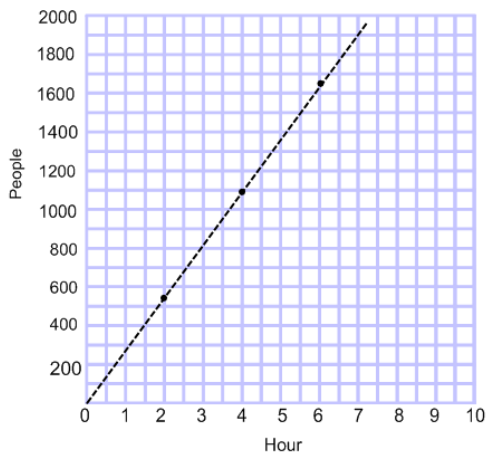
64. The graph shows the cost for bus fares use it to determine the charge per ride.



65. Yasmine gets paid for every dog that she walks according to the graph at the right. What does she earn per dog?



66. The carousel at the carnival is the most popular ride. The ticket taker keeps track of how many people ride during the day. Use the graph to determine how many people ride every hour.



Problem Solving

Classwork

67. Two friends take a bicycle trip. Ricky rides 10 miles in 0.75 an hour. Victoria rides 15 miles in 1.25 hour. Which bicycle rider has the slower rate?

68. Your team scores 2 runs in the first three innings of a 9-inning baseball game. If your team continues to score at that rate, how many runs will it score in the game?

69. A quality control inspector found four defective cell phones out of 480. At that rate, how many defective cell phones would there be out of 24,000?
70. Eight ounces of orange juice contain 120 calories. About how many calories are in 12 ounces of orange juice?
71. At the copy store, 15 copies cost \$.75, you need 50 copies. About how much will they cost?
72. You are testing orange juice recipes. Each recipe calls for orange juice concentrate and water. Mix 1 has 4 cups of concentrate and 6 cups of water, Mix 2 has 1 cup of concentrate and 3 cups of water, and Mix 3 has 2 cups of concentrate and 4 cups of water. Which mix will be the most "orangey", which will be the least "orangey"?
73. There are two size tables at a birthday party. One table seats 10 people and one seats 6. If the table for 10 has 3 cakes on it, and the table for 6 has 2 cakes on it, and the cake is shared equally, will a person sitting at the small table get as much cake as a person sitting at the large?
74. A car traveling 102 miles uses 3 gallons of gas. At this rate, how far can the car travel using 14 gallons of gas?
75. Socks are 3 pairs for \$4.25. If you want to buy 10 pairs, how much will that cost? Set up a proportion and solve.
76. T-shirts cost \$8.00 for 5, how many can you get with \$20? Set up a proportion and solve.

Homework

77. In three hours, you can pack 48 cartons of books. How many cartons of books can be packed in 8 hours?
78. The garden center has a sale, 5 plants for \$18. How much would you spend if you bought 15 plants?
79. Your friend can run 17 miles in 2 hours. If your friend could run for 6 hours at the same rate, how many miles would be run?
80. If 3 pounds of chocolate cost \$25.50, how many pounds can you buy for \$42.50?
81. There are 13 grams of protein in 2 ounces of tuna. How many ounces do you need to eat to get 45.5 grams of protein?
82. The athletic boosters club is sponsoring a spaghetti dinner. Jars of spaghetti sauce are on sale for 5 for \$6.25. How much would 120 jars cost?
83. Two different brands of cereal are on sale at the supermarket this week. One sale is two boxes for \$3.80 and the other sale is five boxes for \$9.00. Which sale is the better buy?
84. A dozen bagels cost \$7.20. At this rate, how much will 7 cost?
85. Shorts are 3 for \$20.00. You want to buy 5, how much will that cost? Set up a proportion and solve.

86. Tank tops cost \$7.25 for 2, how many can you get with \$25? Set up a proportion and solve.

Scale Drawings

Classwork

87. On a map, the scale is $\frac{1}{2}$ inch : 25 miles. What is the actual distance between two cities that are 3 inches apart?

88. What are the dimensions of a 15 foot by 10 foot room on a blueprint with a scale of 1.5 inches : 2 feet?

89. The distance between Newark, NJ and San Francisco, CA is 2,888 miles. How far would that measure on a map with a scale of 3 cm to 1,000 miles?

90. If the scale for a model train is 1 inch for every 10 feet of a real train, how big is the model for an 83-foot train?

Homework

91. On a map, the scale is 1.5 inches : 20 miles. If two cities are 115 miles apart, how far apart are they on the map?

92. A model of a dinosaur built to a scale of 3 cm : 1 m is 24 centimeters tall. How tall was the actual dinosaur?

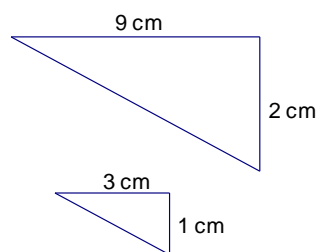
93. What are the dimensions of a building whose dimensions on a blueprint are 1.8 cm by 2.4 cm? The blueprint's scale is 1 cm : 15 feet.

94. The distance between two cities is 180 miles. How far does that measure on a map with a scale of 1 inch : 25 miles?

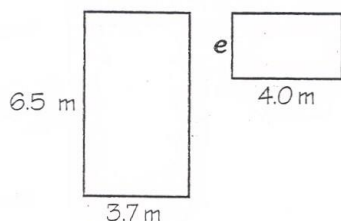
Similar Figures

Classwork

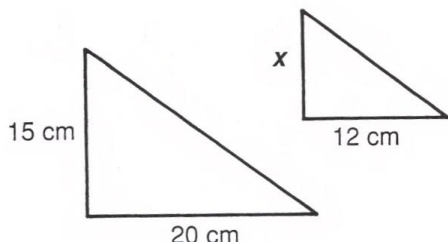
95. Are the figures similar? Justify your answer.



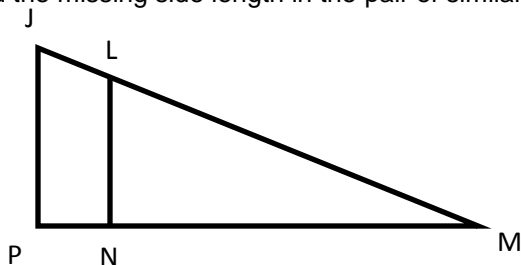
96. Find the value of e in the pair of similar polygons.



97. Find the value of x in the pair of similar polygons.



98. Find the missing side length in the pair of similar polygons.



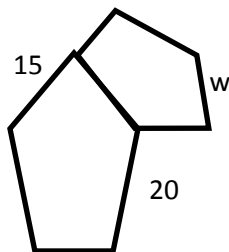
$JP = ?$

$PM = 24 \text{ cm}$

$NM = 20 \text{ cm}$

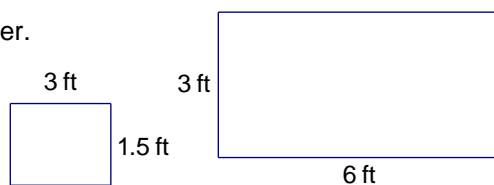
$LN = 6 \text{ cm}$

99. Find the value of w in the pair of similar polygons.

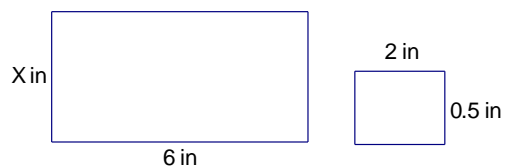


Homework

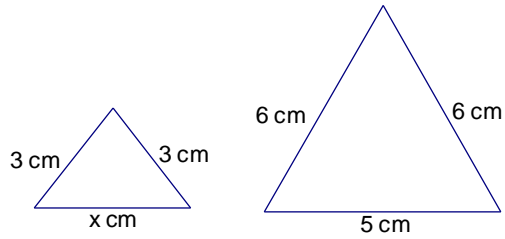
100. Are the figures similar? Justify your answer.



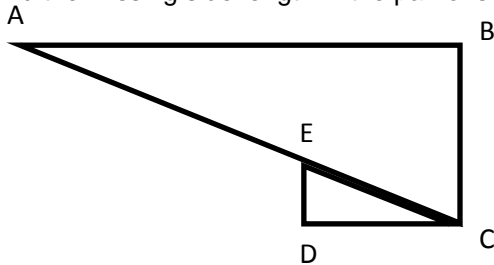
101. Find the value of x in the pair of similar polygons.



102. Find the value of x in the pair of similar polygons.



103. Find the missing side length in the pair of similar polygons.



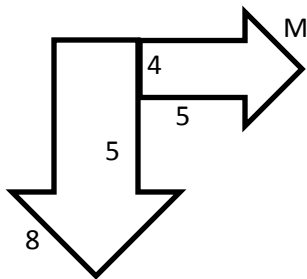
$AB = 37.5 \text{ cm}$

$CD = ?$

$AC = 54 \text{ cm}$

$EC = 4.32 \text{ cm}$

104. Find the length of M in the pair of similar polygons.



Answer Key

1.
 - a. $\frac{1}{4}$
 - b. $\frac{1}{10}$
 - c. $\frac{1}{3}$
 - d. $\frac{7}{1}$
 - e. $\frac{8}{11}$
2.
 - a. 2 to 3, 2:3, $\frac{2}{3}$
 - b. 3 to 5, 3:5, $\frac{3}{5}$
3.
 - a. 5:6
 - b. 1:1
 - c. 5:16
 - d. 16:5
4.
 - a. $\frac{7}{9}$
 - b. $\frac{5}{3}$
 - c. $\frac{1}{10}$
 - d. $\frac{14}{25}$
 - e. $\frac{3}{25}$
5.
 - a. $\frac{1}{4}$, 1:4, 1 to 4
 - b. $\frac{4}{5}$, 4:5, 4 to 5
6.
 - a. 4:3
 - b. 4:5
 - c. 5:12
 - d. 3:1
7.
 - a. False
 - b. True
 - c. False
 - d. True
 - e. False
 - f. True
8. Multiple answers; for example:
 - a. 14:18
 - b. 30:78
 - c. 12:8
 - d. 8:10
 - e. 10:26
 - f. 7:3
9.
 - a. True
 - b. False
 - c. True
 - d. False
 - e. True
 - f. False

10. Multiple answers; for example:

- a. 16/26
- b. 4 to 7
- c. 4:6
- d. 14/18
- e. 8/2
- f. 9 to 7

11. 2 slices/person

12. 20 mpg

13. 8 kids/coach

14. 2.5 C/egg

15. 2 C/day

16. A

17. \$6.60/pizza

18. 72 calories/slice

19. \$9.35/CD

20. \$7.50/hour

21. 90 words/min

22. B

23.

- a. 14
- b. 15
- c. 40
- d. 8
- e. 2

24.

- a. 15
- b. 6
- c. 4
- d. 7
- e. 27

25.

- a. 6
- b. 5
- c. 2
- d. 2
- e. 4.8

26.

- a. 12
- b. 25
- c. 14
- d. 15
- e. 28

27. No

28. Yes

29. Yes

30. No

31. Yes

32. No

33. No

34. Yes

35. $3/5 = 0.6$

36. 7

37. $1/2 = 0.5$

38. 3.8

39. 7

40. $2/3$

41. $7/4 = 1.75$

42. 12

43. 3

44. $1/5 = 0.2$

45. $2/3$

46. 7.25

47. 4

48. $7/8$

49. $1/4 = 0.25$

50. 2

51. $a = 1.25p$

52. $m = 32g$

53. $c = 6.99p$

54. $y = 1/3 x$

55. $g = 1/25 m$, $g = .04m$

56. $p = 7.25h$

57. $c = 11s$

58. $c = 3.15g$

59. $d = 7.5h$

60. $h = 1/20 m$, $h = 0.05m$

61. \$2.75 / ride

62. \$12.50 / child

63. 37.5 miles / gallon

64. \$11.25 / ticket

65. \$3.75 / dog

66. 275 people / hour

67. Victoria

68. 6 runs

69. 200 defective

70. 180 calories

71. \$2.50

72. Most: Mix 1, Least: Mix 2

73. No, they will get less.

74. 476 miles

75. \$14.17

76. 12 shirts

77. 128 cartons

78. \$54

79. 51 miles

80. 5 pounds

81. 7 ounces

82. 120 jars, \$150

83. 5 boxes for \$9

84. \$4.20

85. \$33.33

86. 6 shirts

87. 150 miles

- 88. 11.25 in. by 7.5 in.
- 89. 8.66 cm
- 90. 8.3 in.
- 91. 8.63 in.
- 92. 8m
- 93. 27 feet by 36 feet
- 94. 7.2 in
- 95. No. $9/3 \neq 2/1$ or $9/2 \neq 3/1$
- 96. 2.28 m
- 97. 9 cm
- 98. 7.2 cm
- 99. 11.25
- 100. Yes. $3/1.5 = 6/3$
- 101. 1.5 in.
- 102. 2.5 cm
- 103. 3 cm
- 104. $4.\bar{4}$

Ratios, Rates & Proportions Review
PMI Pre Algebra

Name _____

Multiple Choice— Choose the correct answer for each question. No partial credit will be given.

- It costs \$55.60 for 8 burgers. What is the cost of one burger?
 - \$5.56
 - \$5.95
 - \$6.95
 - \$7.15
- Apples cost 3lbs for \$3.95. Which proportion represents the process for determining the cost per pound?
 - $\frac{3}{16} = \frac{3.95}{x}$
 - $\frac{3}{3.95} = \frac{1}{x}$
 - $\frac{3.95}{x} = \frac{1}{3}$
 - $\frac{x}{1} = \frac{3}{3.95}$
- What is the correct answer for #2?
 - \$0.25
 - \$1.30
 - \$1.32
 - \$3.95
- Two cases of photocopy paper weigh 45 lb. How much do 11 cases weigh?
 - 22.5 lb.
 - 225 lb.
 - 247 lb.
 - 247.5 lb.
- Which has the lowest unit price?
 - 10 oz. for \$0.89
 - \$0.65 for 8 oz.
 - 30 oz for \$2.87
 - \$3.55 for 40 oz.
- A machine takes .45 hours to make 7 parts. At that rate, about how many parts can the machine make in one day?
 - 1.54
 - 15.6
 - 300
 - 373

7. Find the missing number in the following proportion.

$$\frac{1}{3} = \frac{x}{52}$$

- a. 14
 - b. 17.33
 - c. 18
 - d. 156
8. There are two containers with prizes. The large container has 100 prizes and the small container has 75 prizes. You are given a choice to make one selection from either container. The large container contains 15 of the prizes that you want and the small container contains 12 of the prizes that you want. Which container provides you with a better chance of getting your prize?
- a. The large container
 - b. The small container
 - c. The chance of selecting a desired prize is the same from either container.
9. Jose charted the growth of a tree in inches. Which of the following numbers will make the relationship shown in the table proportional?

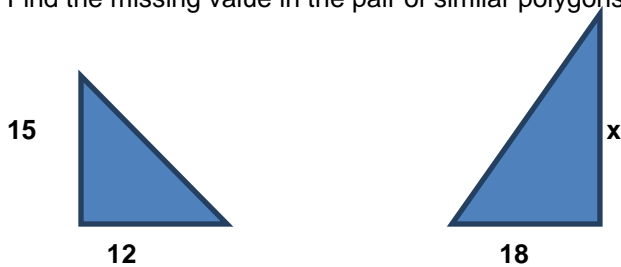
Year	2	3	4	5
Height	27		54	

- a. 27, 54
 - b. 54, 108
 - c. 40.5, 67
 - d. 40.5, 67.5
10. A car traveling 118 miles uses 4 gallons of gas. At this rate, how many gallons will it use traveling 227 miles?
- a. 7
 - b. 7.69
 - c. 472
 - d. 2.08
11. There are 15 cows and 12 horses and 5 pigs in a field. What is the ratio of cows to total animals in the field?
- a. 15 to 12
 - b. 15 to 27
 - c. 15 to 17
 - d. 15 to 32
12. In a sample of 55 randomly selected students at a school, 32 students eat breakfast every morning. There are 1,415 students in the school. Using these results, predict the number of students that eat breakfast.
- a. 823
 - b. 1760
 - c. 1415
 - d. 2432

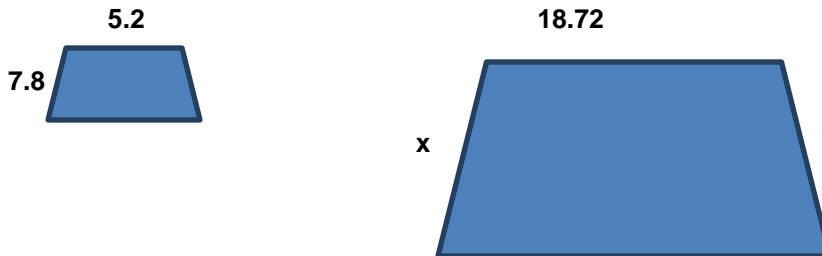
13. While shopping for candy bars, you find several deals. Which is the better buy?
- 1 for \$0.90
 - 3 for \$2.60
 - 5 for \$4.25
 - 8 for \$7.15
14. Charlie picks \$42.50 worth of apples. If he buys exactly 19.4 lbs, what is the price per pound?
- \$2.19
 - \$2.29
 - \$51.53
 - \$824.50
15. There are 136 students at the dance. 62 of the students are female. What is the ratio of boys to girls at the dance?
- 62:136
 - 74:136
 - 37:31
 - 62:74

Short Constructed Response – Write the correct answer for each question. No partial credit will be given.

16. Write the ratio in simplest form: $22:36 = \underline{\hspace{2cm}}$
17. Socks are on sale for \$7.50 for two pair. You have \$42. Write a proportion to illustrate the process for determining the greatest number of pairs of socks that you can purchase? $\underline{\hspace{2cm}}$
18. Find the missing value in the pair of similar polygons. Round to the nearest tenth if necessary.



19. Find the missing value in the pair of similar polygons. Round to the nearest tenth if necessary.



20. A local competitor is selling 3 lbs of bananas for \$1.00. A nearby store is selling 5 lbs of bananas for \$1.70. What price is the better price?

Extended Constructed Response - Solve the problem, showing all work. Partial credit may be given.

21. You are in the catering business and planning for a big event. The chicken recipe indicates that one pound of chicken requires $\frac{1}{4}$ cup of flour and can serve 6 people. There are 200 people attending the event.

- a. How many pounds of chicken will you need?
- b. How many cups of flour will you need?
- c. If there are 15 no shows, how much chicken will be left over, provided everyone ate the amount indicated in the recipe?

22. There is a concert that has been attended by 6,090 fans. The ratio of males to females at the concert is 2:3.

- a. How many males are at the concert?
- b. How many females are at the concert?
- c. The stadium predicted that they would need 3 sodas for every five people in attendance. If the fans purchased soda at this rate, how many sodas were sold?

23. A recipe calls for $\frac{1}{2}$ stick of butter, $\frac{3}{4}$ cup of sugar, 2 tsp of cinnamon, $\frac{1}{4}$ cup of flour and 2 eggs.

The recipe serves 4 people. Mary needs to serve 6 people. How much of each ingredient will she need?

Butter?

Sugar?

Cinnamon?

Flour?

Eggs?

24. For every A earned, Max's parents allowed Max to stay up 15 minutes later. Max's normal bedtime was 8:30.

- a. For Max's bedtime to change to 9:00 how many A's must he earn?
- b. Max would like to have his bedtime to be one hour later. How many A's would that require?
- c. For every C, Max's parents made his bedtime $\frac{1}{2}$ hour earlier! Max earned 2 A's and 2 C's. What time must he go to bed?

Unit Review Ratios & Proportions Answer Key

1. C
2. B
3. C
4. D
5. B
6. D
7. B
8. B
9. D
10. B
11. D
12. A
13. C
14. A
15. C
16. 11:18
17. $7.50/2 = 42/x$
18. 22.5
19. 28.1
20. 3 for \$1.00
21. A. 33.3 lbs
B. 8.3 cups
C 2.5 lbs
22. 2436 males

3654 females

3654 sodas
23. Butter: $\frac{3}{4}$ stick
Sugar: $\frac{9}{8}$ cup
Cinnamon: 3 tsp
Flour: $\frac{3}{8}$ cup
Eggs: 3
24. 2
4
8:00