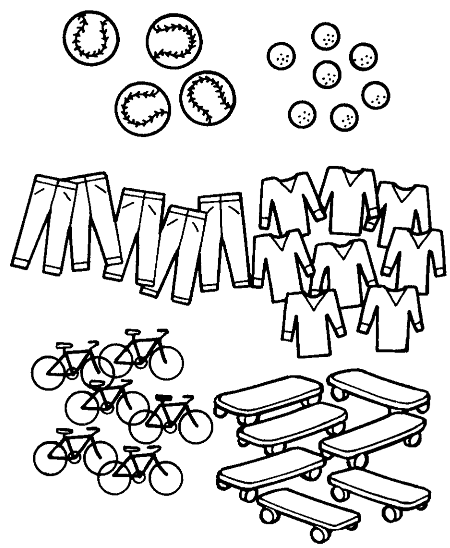
9 Practice Solving Word Problems with Simple Ratios and Rates

Directions: Use the information on page 37 to help you answer these questions. Use both forms of ratio in your answer. The first one is done for you.



1. Ratio of baseballs to golf balls 4/7 or 4:7
   Ratio of baseballs to all balls 4/11 or 4:11
   Ratio of golf balls to baseballs 7/4 or 7:4
   Ratio of golf balls to all balls 7/11 or 7:11

2. Ratio of jeans to shirts____________
   Ratio of jeans to clothes items ____________
   Ratio of shirts to jeans____________
   Ratio of shirts to clothes items_____________

3. Ratio of bicycles to skateboards____________
   Ratio of bicycles to wheeled vehicles_____________
   Ratio of skateboards to bicycles____________
   Ratio of skateboards to wheeled vehicles ____________

Directions: Write these rates as ratios as a fraction and with a colon. The first one is done for you. A rate always has a denominator of 1.

4. 60 miles per gallon
   60/1 or 60:1

5. 55 miles per hour
   ______ or _____

6. 16 ounces to a pound
   ______ or _____

7. 1,200 rpm (revolutions per minute)
   ______ or _____

8. 24 hours in a day
   ______ or _____

9. 60 minutes to an hour
   ______ or _____

10. 365 days to a year
    ______ or _____

11. 8% apr (annual percentage rate)
    ______ or _____

9 Practice · · · · · · · · · · · · · · Solving Word Problems with Proportion

Directions: Use the information on page 37 to help you solve these word problems. Use an equation in either fraction or colon format to solve each problem. The first one has been done for you.

1. You can run a distance of 2 blocks in 3 minutes. How many blocks can you run in 18 minutes?

   Equation: $2:3 :: n:18$ or $2/3 = n/18$

   $3 \times n = 2 \times 8$

   $3n = 36$

   $n = 12$

   Answer: You can run 12 blocks.

2. You can read 5 pages of a novel in 3 minutes. How many pages of the novel can you read in 60 minutes?

   Equation: __________

   Answer: ___________

3. It takes you 5 minutes to mow 7 square yards of a lawn. How long would it take to mow 630 square yards?

   Equation: __________

   Answer: ___________

4. A running faucet sends 14 gallons of water down the drain every 3 minutes. How many gallons will go down the drain in 90 minutes?

   Equation: __________

   Answer: ___________

5. A clothes washer uses 170 gallons of water for 4 loads. How many gallons would be used for 240 loads?

   Equation: __________

   Answer: ___________

6. A volunteer beach clean up crew collected 20 bags of trash in 3 hours. How many hours would it take them to collect 1,000 bags of trash?

   Equation: __________

   Answer: ___________

7. The average American uses about 145 pounds of paper every 3 months. How many pounds of paper are used in 24 months?

   Equation: __________

   Answer: ___________

9 Practice · · · · · · · · · · ·

Solving Word Problems with Rates and Proportions

Directions: Use the information on page 37 to help you solve these word problems. Use an equation in either fraction or colon format to solve each problem.

1. If you travel at a speed of 55 miles per hour, how far will you travel in 7 hours?

   Equation: __________
   Answer: ___________

2. A car will travel 18 miles on 1 gallon of gasoline. How far will it travel on 20 gallons of gasoline?

   Equation: __________
   Answer: ___________

3. There are 60 minutes in 1 hour. How many minutes are there in $5\frac{1}{2}$ hours?

   Equation: __________
   Answer: ___________

4. There are 24 hours in 1 day. How many hours are in 13.5 days?

   Equation: __________
   Answer: ___________

5. Each month Americans throw away 2 million tons of leaves and grass. How many tons are thrown away in 48 months?

   Equation: __________
   Answer: ___________

6. A car traveled 2,980 miles between Boston and Los Angeles. The car traveled at an average speed of 40 miles per hour. How long did it take the car to travel this distance?

   Equation: __________
   Answer: ___________

7. A bicyclist traveled 100 miles in 9 hours. How many miles did she travel in 40.5 hours?

   Equation: __________
   Answer: ___________

8. There are 16 ounces in 1 pound. How many ounces are there in a 45-pound dog?

   Equation: __________
   Answer: ___________

Challenge

- There are 60 seconds in 1 minute. How many seconds are there in 1 day? __________
- There are 24 hours in 1 day. How many hours are there in 1 year? __________

6. $n + 9n + 2n = 144$
$12n = 144$
$n = 12$
Daniel has 12 stamps.
Bryan has 24 stamps.
George has 108 stamps.

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1. $n + (n + 25) + (n + 23) = 93$
$3n + 48 = 93$
$n = 15$
Fred is 15 years old.
Mom is 38 years old.
Dad is 40 years old.
2. $3n + 220 = 310$
$n = 30$
The skateboard is $30.
The scooter is $90.
The bike is $190.
3. $9n + 6 = 3(n + 6)$
$n = 2$
Jimmy is 2 years old.
Brother is 18 years old.
4. $n + (n – 5) + (n + 2) + (n + 8) = 53$
$4n + 5 = 53$
$n = 12$
Jesse is 12 years old.
Maybelle is 7 years old.
Ellen is 14 years old.
Jeanne is 20 years old.
5. $n + (n + 15) + (n – 10) + (n + 23) = 108$
$4n + 28 = 108$
$n = 20$
Joseph had $20.00.
Elsa had $35.00.
Julian had $10.00.
Martha had $43.00.
6. $n + 2n + 4n = 105$
$7n = 105$
$n = 15$
Melissa had $15.00.
Christina had $30.00.
Charmain had $60.00.
7. $n + 3n + (3n – 10) = 74$
$7n – 10 = 74$
$n = 12$
Kristin had $12.00.
Matthew had $36.00.
Joshua had $26.00.
8. $n + (n + 8) + 3n + (n – 5) = 63$
$6n + 3 = 63$
$n = 10$
Andrew is 10 years old.
Kenneth is 18 years old.
Billy is 30 years old.
Cameron is 5 years old.

Page 38

1. 4/7 or 4:7
4/11 or 4:11
7/4 or 7:4
7/11 or 7:11
2. 5/8 or 5:8
5/13 or 5:13
8/5 or 8:5
8/13 or 8:13
3. 6/7 or 6:7
6/13 or 6:13
7/6 or 7:6
7/13 or 7:13
4. 60/1 or 60:1
5. 55/1 or 55:1
6. 16/1 or 16:1
7. 1,200/1 or 1,200:1
8. 24/1 or 24:1
9. 60/1 or 60:1
10. 365/1 or 365:1
11. 8/100 or 8:100

Page 39

1. 2:3 :: n:18
n = 12 blocks
2. 5:3 :: n:60
n = 100 pages
3. 5:7 :: n:630
n = 450 minutes
4. 14:3 :: n:90
n = 420 gallons
5. 170:4 :: n:240
n = 10,200 gallons
6. 20:3 :: 1000:n
n = 150 hours
7. 145:3 :: n:24
n = 1,160 lb.

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1. 55:1 :: n:7
n = 385 miles
2. 18:1 :: n:20
n = 360 miles
3. 60:1 :: n:5.5
n = 330 minutes
4. 24:1 :: n:13.5
n = 324 hours
5. 2,000,000:1 :: n:48
n = 96,000,000 tons
6. 2,980:n :: 40:1
n = 74.5 hr.
7. 100:9 :: n:40.5
n = 450 miles
8. 16:1 :: n:45
n = 720 oz.

Challenge: 86,400 sec.; 8,760 hr.

Page 41

1. 600 calories
2. 650 calories
3. 400 calories
4. 2,500 calories
5. handball and bicycling
6. 1,650 calories
7. bicycling and walking
8. 3-hr. walk
9. Answers will vary.
10. 8 states
11. 7 states
12. 12 states
13. 1 to 5 million
14. Answers will vary.
15. California has the most.
Wyoming has the least.
16. Answers will vary.

Page 42

1. Friday
2. Thursday
3. 15˚ to 20˚
4. Monday
5. Wednesday and Friday
6. Tuesday and Saturday
7. Monday, Saturday, and Sunday
8. 91.7˚ or 92˚
9. 71.7˚ or 72˚
10. Answers will vary.
11. water
12. nitrogen
13. 32%
14. other category
15. 47%
16. Answers will vary.

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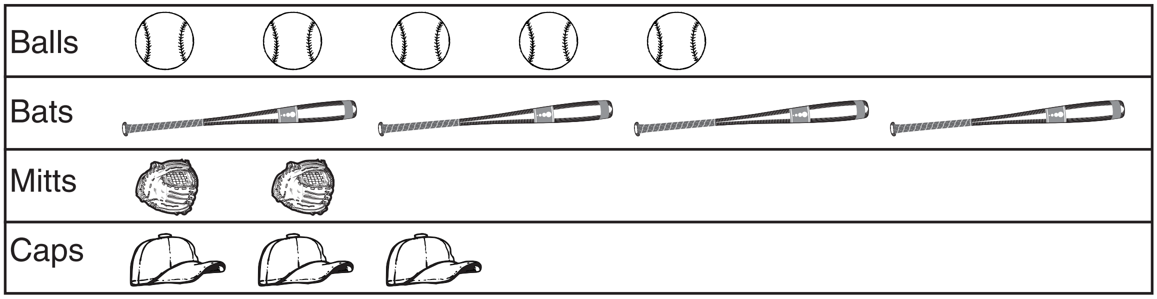
1. +2 – 12 = -10
You owe $10.00.
2. 32 – 40 = -8
8 below 0
3. -4 + -11 + -6 = -21
21 below par
4. -$1000 + $750 = $250
$250 owed
5. -600 + 200 + 100 + 150 = -150
He needed 150 points to get to 0.
6. -69 + 35 = -34˚ F
7. -129 – (+)136 = -265
265˚ difference
8. -80 – (+)134 = -214
214˚ difference

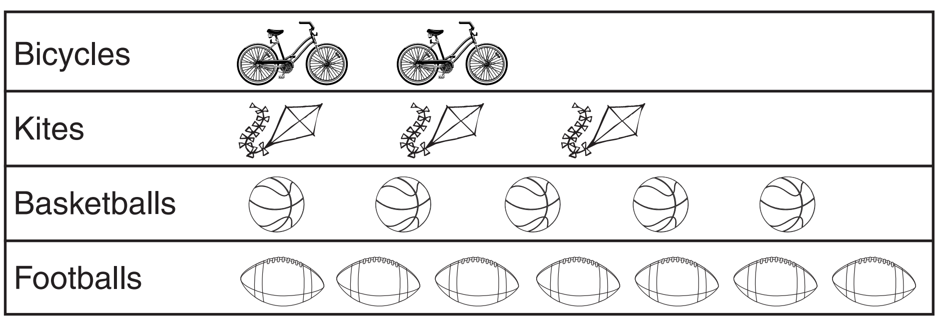
Practice 32

Discount Sporting Goods has thousands of items to appeal to every taste. The store is loaded with a variety of sporting equipment. Help the owners compute these ratios.



Directions: Use the illustration to help you compute these ratios. The first one is done for you.

1. What is the ratio of baseballs to bats? 5:4 or 5/4
2. What is the ratio of bats to baseballs? ________________
3. What is the ratio of mitts to balls? ________________
4. What is the ratio of balls to mitts? ________________
5. What is the ratio of caps to balls? ________________
6. What is the ratio of balls to caps? ________________
7. What is the ratio of bats to caps? ________________
8. What is the ratio of caps to bats? ________________



9. What is the ratio of bicycles to kites? ________________
10. What is the ratio of kites to bicycles? ________________
11. What is the ratio of footballs to basketballs? ________________
12. What is the ratio of basketballs to footballs? ________________
13. What is the ratio of kites to footballs? ________________
14. What is the ratio of footballs to kites? ________________
15. What is the ratio of balls to bicycles? ________________
16. What is the ratio of bicycles to balls? ________________
17. What is the ratio of kites to footballs? ________________
18. What is the ratio of footballs to kites? ________________

Practice 33

At Micro Models they design the exact replicas of houses, schools, businesses, sports arenas, and other structures. Help them complete the proportions in the problems below. The first one is done for you.

Reminder: To solve a proportion, the product of the means (middle terms) equals the product of the extremes (end terms).

1. Each inch of a model house represents 4 feet of a real house. How many feet are represented by 20 inches?

   Equation: 1:4 :: 20:*n so n* = 80

   Answer: 80 feet

2. One inch on a model basketball court equals 2 feet. How many feet are represented by 25 inches?

   Equation: 1:2 :: 25:n

   Answer: ______________________

3. On a model school, 3 centimeters represents 15 meters. How many meters are represented by 9 centimeters?

   Equation: ______________________

   Answer: ______________________

4. The height on a model skyscraper uses a scale of 4 centimeters for each story. How many stories are represented by 100 centimeters?

   Equation: ______________________

   Answer: ______________________

5. The length of a model football field represented by a scale of 3 inches for 10 yards. How many yards are represented by 33 inches?

   Equation: ______________________

   Answer: ______________________

6. The length of a model swimming pool is represented by 3 centimeters to every 10 meters. How many meters are represented by 15 centimeters?

   Equation: ______________________

   Answer: ______________________

7. The length of a road is represented by a scale of 5 inches for every 3 miles. How many inches will be used to represent 30 miles?

   Equation: ______________________

   Answer: ______________________

8. The length of 7 yards on a scale model is represented by 2 inches. How many inches would be used to represent 42 yards?

   Equation: ______________________

   Answer: ______________________

Answer Key (cont.)

3. no
4. 5 m.p.h.
5. 20 m.p.h.
6. the scale doesn't go 0 to 70
7. start at 0/use a different scale
8. 1995
9. 1998
10. 10 thousand dollars
11. the scale is distorted, starts at 40
12. 25 thousand dollars
13. scale starts at 40 thousand dollars
14. starts at 0 and go to 70

Page 27

1. 920 feet
   48,000 feet^2
2. 288 feet
   4,700 feet^2
3. 360 feet
   8,100 feet^2
4. 600 feet
   20,000 feet^2
5. 320 yd.
   6,000 yd.^{2}
6. 260 feet
   4,225 feet^2
7. 346 m
   7,300 m^2
8. 350 yd.
   7,150 yd.^{2}

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1. 240 feet^2
2. 450 feet^2.
3. 1,035 feet^2
4. 240 feet^2
5. 4,171 feet^2
6. 1,155 feet^2
7. 672 feet^2
8. 87.5 feet^2
9. 99.6 feet^2
10. 484 feet^2

Page 29

1. C = πd
   C = 3.14 x 9
   28.26 centimeters
2. C = πd
   C = 3.14 x 23
   72.22 centimeters
3. C = 2πr
   C = 2 x 3.14 x 2
   12.56 centimeters
4. C = πd
   C = 3.14 x 2
   6.28 centimeters
5. C = πd
   C = 3.14 x 2.6
   8.164 centimeters
6. C = 2πr
   C = 2 x 3.14 x 12
   75.36 inches
7. C = 2πr
   C = 2 x 3.14 x 2
   12.56 inches
8. C = 2πr
   C = 2 x 3.14 x 3
   18.84 centimeters

Page 30

1. A = πr^2
   A = 3 x 3 x 3.14
   28.26 cm^2
2. A = πr^2
   A = 3.14 x 8 x 8
   200.96 inches^2
3. A = πr^2
   A = 3.14 x 6 x 6
   113.04 cm^2
4. A = πr^2
   A = 3.14 x 7 x 7
   153.86 millimeters^2
5. A = πr^2
   A = 3.14 x 9 x 9
   254.34 millimeters^2
6. A = πr^2
   A = 3.14 x 2 x 2
   12.56 feet^2
7. A = πr^2
   A = 3.14 x 4 x 4
   50.24 feet^2
8. A = πr^2
   A = 3.14 x 4.5 x 4.5
   63.585 cm^2
9. A = πr^2
   A = 3.14 x 3.5 x 3.5
   38.465 cm^2
10. A = πr^2
    A = 3.14 x 1.15 x 1.15
    4.15265 cm^2

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1. 216 inches^3
2. 27 cm^3
3. 729 inches^3
4. 8 inches^3
5. 125 inches^3
6. 900 cubic puzzles
7. 192 cubic magnifying glasses
8. 1,000 cm^3 blocks
9. 120 games
10. 1,728 cubic puzzles

Page 33

1. library
2. town hall
3. gas station
4. (-11, 1)
5. (4, -4)
6. (-5, -9)
7. park
8. (-10, -7)
9. (-9, 5)
10. general store
11. drug store
12. III
13. I
14. II

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1. 3/10	6. 3/40
2. 4/15	7. 2/3
3. 9/50	8. 8/45
4. 11/16	9. 2/5
5. 1/2	10. 1/27

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1. $n = 35 - 12$
   $n = 23$
2. $23 + n = 41$
   $n = 18$
3. $n - 29 = 61$
   $n = 90$
4. $36 + n = 53$
   $n = 17$
5. $19 + n = 43$
   $n = 24$
6. $n/4 = 12$
   $n = 48$
7. n x 12 = 96
   $n = 8$
8. $n/8 = 11$
   $n = 88$
9. n x 19 = 190
   $n = 10$
10. $42/n = 6$
    $n = 7$

Page 36

1. 5:4 or 5/4
2. 4:5 or 4/5
3. 2:5 or 2/5
4. 5:2 or 5/2
5. 3:5 or 3/5
6. 5:3 or 5/3
7. 4:3 or 4/3
8. 3:4 or 3/4
9. 2:3 or 2/3
10. 3:2 or 3/2
11. 7:5 or 7/5
12. 5:7 or 5/7
13. 3:7 or 3/7
14. 7:3 or 7/3
15. 12:2 or 12/2 or 6:1 or 6/1
16. 2:12 or 2/12 or 1:6 or 1/6
17. 3:7 or 3/7
18. 7:3 or 7/3

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1. 1:4 :: 20:n
   n = 80 feet
2. 1:2 :: 25:n
   n = 50 feet
3. 3:15 :: 9:n
   n = 45 m
4. 4:1 :: 100:n
   n = 25 stories
5. 3:10 :: 33:n
   n = 110 yd.
6. 3:10 :: 15:n
   n = 50 m
7. 5:3 :: n:30
   n = 50 inches
8. 7:2 :: 42:n or
   2:7 :: n:42
   n = 12 inches

Page 38

1. 528
   9
   59 (58.67)
2. 911
   11
   83 (82.8)
3. 1,160
   13
   89 (89.2)
4. 138
   10
   14 (13.8)
5. 63
   12
   5 (5.25)
6. 175
   13
   13 (13.46)
7. 109
   16
   7 (6.8)

Page 39

1. (46, 47, 48, 49, 50, 52, 52, 52, 53, 54, 56)
   52
   52
2. (47, 49, 55, 56, 57, 58, 59, 59, 59, 60, 60, 61, 63)
   59
   59
3. (57, 59, 59, 60, 61, 61, 63, 63, 65, 66)
   59, 61, 63
   61
4. (47, 49, 49, 49, 51, 52, 53, 54, 55, 57, 59)
   49
   52
5. (39, 40, 44, 44, 45, 48, 50, 55, 57, 57, 58, 60, 60, 61)
   44, 57, 60
   52.5

Page 40

1. C	6. C
2. D	7. B
3. B	8. D
4. A	9. B
5. A	10. D

Page 41

1. B	6. A
2. D	7. C
3. C	8. A
4. A	9. B
5. D	10. C

Page 42

1. A	6. B
2. B	7. D
3. C	8. C
4. B	9. A
5. D	10. D

Page 43

1. C	6. B
2. C	7. A
3. B	8. D
4. D	9. B
5. D	10. C

Page 44

1. C	6. A
2. C	7. C
3. A	8. B
4. B	9. D
5. D	10. C

Page 45

1. C	6. C
2. A	7. A
3. B	8. B