Lesson 3.1   Understanding Ratios

A **ratio** compares 2 numbers. When written out, several phrases can show how the ratio should be written.

4 to 2	4:2	$\frac{4}{2}$ or $\frac{2}{1}$
6 out of 8	6:8	$\frac{6}{8}$ or $\frac{3}{4}$

Express each ratio as a fraction in simplest form.

a   **b**

1.   15 feet out of 36 feet _____   5 pounds to 35 pounds _____

2.   48 rainy days out of 60 days _____   28 snow days out of 49 days _____

3.   10 pints to 20 pints _____   40 cups to 55 cups _____

4.   10 miles out of 12 miles _____   28 red bikes out of 40 bikes _____

5.   18 beetles out of 72 insects _____   63 gallons to 84 gallons _____

6.   49 dimes out of 77 coins _____   12 cakes out of 36 cakes _____

7.   15 students out of 30 students _____   3 floors out of 18 floors _____

8.   36 meters out of 100 meters _____   14 hats out of 20 accessories _____

9.   80 scores out of 90 scores _____   2 sports out of 19 sports _____

10. 42 cars out of 124 cars _____   7 messages out of 84 messages _____

Lesson 3.1 Understanding Ratios

Ratios can be written based on the number of objects in a set.

There are 2 bottles of soda and 5 bottles of water in the refrigerator. Write the ratio of sodas to waters.
$\frac{2}{5}$

Express each ratio as a fraction in simplest form.

a & **b**

1. There are 2 cubes and 15 spheres in a geometry box. Write the ratio of spheres to cubes.

   _____

   There are 5 cars and 4 vans in a parking lot. Write the ratio of vans to cars.

   _____

2. There are 5 horses and 15 elephants in a circus. Write the ratio of elephants to horses.

   _____

   There are 16 horses and 14 elephants in a circus. Write the ratio of horses to elephants.

   _____

3. There are 11 blue marbles and 7 red marbles in a box. Write the ratio of red marbles to blue marbles.

   _____

   There are 12 apples and 15 oranges in a fruit basket. Write the ratio of apples to oranges.

   _____

4. There are 5 blue marbles and 16 red marbles in a box. Write the ratio of blue marbles to red marbles.

   _____

   There are 12 dogs and 7 cats in a park. Write the ratio of cats to dogs.

   _____

5. There are 14 cars and 7 vans in a parking lot. Write the ratio of cars to vans.

   _____

   There are 7 blue marbles and 8 red marbles in a bag. Write the ratio of red marbles to blue marbles.

   _____

6. There are 6 pennies and 10 dimes in a jar. Write the ratio of pennies to dimes.

   _____

   There are 24 butterflies and 16 snails on the ground. Write the ratio of butterflies to snails.

   _____

Lesson 3.2 Solving Ratios

A proportion can be used in problem solving.

The ratio of apples to oranges is 4 to 5. There are 20 oranges in the basket. How many apples are there?

$\frac{4}{5} = \frac{n}{20}$ Set up a proportion, using n for the missing number.

$4 \times 20 = 5 \times n$ Cross-multiply.

$\frac{80}{5} = n$ Solve for n.

$16 = n$ There are 16 apples.

Solve.

	a	**b**	**c**
1.	$\frac{1}{3} = \frac{n}{24}$ _____	$\frac{4}{9} = \frac{n}{36}$ _____	$\frac{5}{45} = \frac{n}{9}$ _____
2.	$\frac{3}{5} = \frac{n}{15}$ _____	$\frac{10}{70} = \frac{n}{7}$ _____	$\frac{25}{40} = \frac{n}{16}$ _____
3.	$\frac{7}{12} = \frac{n}{36}$ _____	$\frac{13}{26} = \frac{n}{4}$ _____	$\frac{7}{1} = \frac{n}{3}$ _____
4.	$\frac{8}{5} = \frac{n}{40}$ _____	$\frac{2}{6} = \frac{n}{33}$ _____	$\frac{5}{13} = \frac{n}{39}$ _____
5.	$\frac{5}{6} = \frac{n}{18}$ _____	$\frac{9}{8} = \frac{n}{32}$ _____	$\frac{2}{3} = \frac{n}{15}$ _____

Lesson 3.2 Solving Ratios

The missing number can appear any place in a proportion.
Solve the same way.

$$\frac{2}{3} = \frac{6}{n}$$

$3 \times 6 = 2 \times n$

$\frac{18}{2} = n$

$9 = n$

$$\frac{3}{5} = \frac{n}{10}$$

$3 \times 10 = 5 \times n$

$\frac{30}{5} = n$

$6 = n$

$$\frac{3}{n} = \frac{6}{8}$$

$3 \times 8 = 6 \times n$

$\frac{24}{6} = n$

$4 = n$

$$\frac{n}{4} = \frac{3}{6}$$

$4 \times 3 = 6 \times n$

$\frac{12}{6} = n$

$2 = n$

Solve.

	a	b	c
1.	$\frac{n}{3} = \frac{3}{9}$ _____	$\frac{5}{3} = \frac{15}{n}$ _____	$\frac{2}{n} = \frac{1}{4}$ _____
2.	$\frac{15}{30} = \frac{2}{n}$ _____	$\frac{4}{6} = \frac{n}{24}$ _____	$\frac{n}{7} = \frac{15}{21}$ _____
3.	$\frac{6}{n} = \frac{15}{20}$ _____	$\frac{n}{12} = \frac{9}{18}$ _____	$\frac{9}{2} = \frac{27}{n}$ _____
4.	$\frac{7}{9} = \frac{n}{63}$ _____	$\frac{15}{n} = \frac{12}{4}$ _____	$\frac{40}{100} = \frac{n}{25}$ _____
5.	$\frac{35}{n} = \frac{4}{8}$ _____	$\frac{16}{4} = \frac{36}{n}$ _____	$\frac{n}{12} = \frac{25}{30}$ _____