LESSON 2-2

Constant Rates of Change

Practice and Problem Solving: D

Use the table to determine whether the relationship is proportional.
If so, write an equation to show the relationship between the two
quantities. Tell what each of the variables you used represents.
The first one has been done for you.

1.

Teams	1	2	3	4
Number of Players	6	12	18	24

a. Proportional? _____yes_____

b. Equation: _____$y = 6x$_____

c. Number of teams: _____x_____

d. Number of players: _____y_____

2.

Time (h)	1	2	3	4
Cars Washed	3	6	9	12

a. Proportional? _____

b. Equation: _____

c. Number of hours: _____

d. Cars washed: _____

3.

Weight (lb)	3	4	5
Cost ($)	2.25	3.00	3.75

_____

_____

_____

4.

Time (min)	2	3	4
Songs Played	10	14	20

_____

_____

_____

The following tables show proportional relationships. Find the
constant of proportionality, *k*. Then write an equation to show the
relationship between the two quantities. Tell what each of the
variables you used represents. The first one has been done for you.

5.

Apples	5	10	15	20
Bags	1	2	3	4

$k = \dfrac{1}{5}$

$y = \dfrac{1}{5}x;$

$x = $ apples; $y = $ bags

6.

Cartons	1	2	4	5
Eggs	12	24	48	60

$k = $ _____

_____

_____

LESSON	**Unit Rates**
4-1	*Practice and Problem Solving: D*

Solve. The first one is done for you.

1. To make 2 loaves of banana bread, Leandra needs 6 eggs.
   How many eggs are needed to make 1 loaf of banana bread?

   $$\frac{6\ \text{eggs}}{2\ \text{loaves}} = \frac{3\ \text{eggs}}{1\ \text{loaf}}$$

   Leandra needs _____**3**_____ eggs to make 1 loaf of banana bread.

2. On his way to visit his sister at college, Gregg drives 135 miles in
   3 hours. What is his average rate of speed in miles per hour?

   $$\frac{135\ \text{miles}}{3\ \text{hours}} = \frac{\text{miles}}{1\ \text{hour}}$$

   Gregg's average rate of speed is _____ miles per hour.

3. Jan designs a new logo for Kim's website. Kim pays Jan $45 for
   5 hours of work. How much money does Kim pay Jan per hour?

   _____

4. At a discount grocery store, Jessica paid $0.72 for an 8-ounce bottle of
   spring water. What is the cost of the spring water per ounce?

   _____

5. A bucket is leaking. After 3 hours the bucket has leaked $\frac{3}{4}$ of an

   ounce. How many ounces per hour is the bucket leaking?

   $$\frac{\frac{3}{4}\ \text{oz}}{3\ \text{h}} = \frac{3}{4} \div \frac{3}{1} = \frac{}{}\times\frac{}{} = \frac{\text{oz}}{1\ \text{h}}$$

   _____

6. After 15 minutes a train has moved $\frac{9}{2}$ miles toward its destination.

   How many miles per minute is the train moving?

   _____

7. A snack that Reginald just bought has 150 calories in $\frac{3}{4}$ of a serving.

   How many calories per serving is this?

   $$\frac{150\ \text{cal}}{\frac{3}{4}\ \text{serving}} = \frac{150}{1} \div \frac{}{} = \frac{150}{1}\times\frac{}{} = \frac{\text{cal}}{1\ \text{serving}}$$

   _____

LESSON 7-3 Solving Two-Step Inequalities

Reteach

When you solve a real-world two-step inequality, you have to
- be sure to solve the inequality correctly, and
- interpret the answer correctly in the context of the problem.

Example

The catfish pond contains 2,500 gallons of water. The pond can hold no more than 3,000 gallons. It is being filled at a rate of 110 gallons per hour. How many whole hours will it take to fill but not overfill the pond?

Step 1: Solve the inequality.

- The pond already contains 2,500 gallons.
- The pond can be filled at a rate of 110 gallons per hour, or $110h$ for the number of gallons added in h hours.
- The pond can hold no more than 3,000 gallons, so $2,500 + 110h \le 3,000$.
- Solve the inequality:
  $2,500 - 2,500 + 110h \le 3,000 - 2,500$
  $110h \le 500$, or $h \le 4.5$ hours.

Step 2: Interpret the results.

The problem asks for how many *whole* hours would be needed to fill the pond with not more than 3,000 gallons. Since $h \le 4.5$ hours, 5 hours would fill the pool to overflowing. So, the nearest number of *whole* hours to fill it but not to overfill it would be 4 hours.

1. A cross-country racer travels 20 kilometers before she realizes that she has to cover at least 75 kilometers in order to qualify for the next race. If the racer travels at a rate of 10 kilometers per hour, how many whole hours will it take her to reach the 75-kilometer mark?

With inequality problems, many solutions are possible. In real-world problems these solutions need to examined for sense.

Example

An animal shelter has $2,500 in its reserve fund. The shelter charges $40 per animal placement and would like to have at least $4,000 in its reserve fund. If the shelter places 30 cats and 10 dogs, will that be enough to meet its goal?

Step 1

Write and solve the inequality:
$2,500 + 40a \ge 4,000$, or $40a \ge 1,500$
$a \ge 37.5$

Step 2

If the shelter places 30 cats and 10 dogs, or 40 animals, that will be enough to meet its goal, because $a = 40$ is a solution to the inequality $a \ge 37.5$.

2. What is the greatest number of bird boxes that must be sold to reduce the inventory from $75 worth of boxes to no fewer than $10 worth of boxes if each box sells for $7?

LESSON 7-3
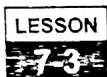
Solving Two-Step Inequalities

Practice and Problem Solving: A/B

Fill in the blanks to show the steps in solving the inequality.

1. $3x - 5 < 19$

$3x - 5 + \underline{\hspace{1cm}} < 19 + \underline{\hspace{1cm}}$

$3x < \underline{\hspace{2cm}}$

$3x \div \underline{\hspace{1cm}} < \underline{\hspace{1cm}} \div \underline{\hspace{1cm}}$

$x < \underline{\hspace{2cm}}$

2. $-2x + 12 < -4$

$-2x + 12 - \underline{\hspace{1cm}} < -4 - \underline{\hspace{1cm}}$

$-2x < \underline{\hspace{2cm}}$

$-2x \div \underline{\hspace{1cm}} > \underline{\hspace{1cm}} \div \underline{\hspace{1cm}}$

$x > \underline{\hspace{2cm}}$

3. Why do the inequality signs stay the same in the last two steps of Exercise 1?

_____

4. Why is the inequality sign reversed in the last two steps of Exercise 2?

_____

Solve the inequalities. Show your work.

5. $-7d + 8 > 29$

6. $12 - 3b < 9$

7. $\dfrac{z}{7} - 6 \geq -5$

_____   _____   _____

_____   _____   _____

_____   _____   _____

8. Fifty students are trying to raise at least $12,500 for a class trip. They have already raised $1,250. How much should each student raise, on average, in order to meet the goal? Write and solve the two-step inequality for this problem.

_____

_____

9. At the end of the day, vegetables at Farm Market sell for $2.00 a pound, and a basket costs $3.50. If Charlene wants to buy a basket and spend no more than $10.00 total, how many pounds of vegetables can she buy? Write and solve the inequality.

_____

Area of Circles

LESSON 9-2

Reteach

The area of a circle is found by using the formula $A = \pi r^2$. To find the area, first determine the radius. Square the radius and multiply the result by π. This gives you the exact area of the circle.
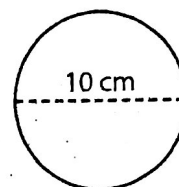
Example:

Find the area of the circle in terms of π.

The diameter is 10 cm. The radius is half the diameter, or 5 cm.
Area is always given in square units.

$$5^2 = 25$$
$$A = 25\pi \text{ cm}^2$$

A circle labeled 10 cm

Find the area of each circle in terms of π.

1. A vinyl album with a diameter of 16 inches.

2. A compact disc with a diameter of 120 mm.

_____

_____

Sometimes it is more useful to use an estimate of π to find your answer.
Use 3.14 as an estimate for π.

Example:

Find the area of the circle. Use 3.14 for π and round your answer to the nearest tenth.

The radius is 2.8 cm.
Area is always given in square units.

$$2.8^2 = 7.84$$
$$A = 7.84\pi \text{ cm}^2$$
$$A = 7.84 \times 3.14 \text{ cm}^2$$
$$A = 24.6176 \text{ cm}^2$$

Rounded to the nearest tenth, the area is 24.6 cm².

A circle labeled 2.8 cm
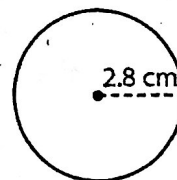
Find the area of each circle. Use 3.14 for π and round your answer to the nearest tenth.

3. A pie with a radius of 4.25 inches.

4. A horse ring with a radius of 10 yards.

_____

_____

5. A round pond with a diameter of 24 m.

6. A biscuit with a diameter of 9.2 cm.

_____

_____

Name _____ Date _____ Class _____
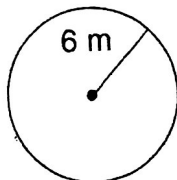
Area of Circles

Practice and Problem Solving: A/B

Find the area of each circle to the nearest tenth. Use 3.14 for π.
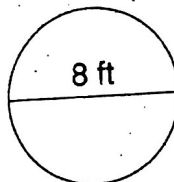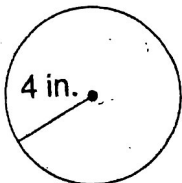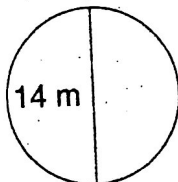
1.

6 m

   A 113 m^2 C 354.9 m^2

   B 37.7 m^2 D 452.16 m^2

2.

8 ft

   A 201 ft^2 C 25.1 ft^2

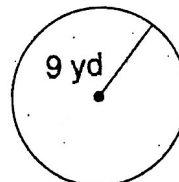   B 50.2 ft^2 D 157.8 ft^2

3.

4 in.

_____

4.

14 m

_____

5.

9 yd

_____
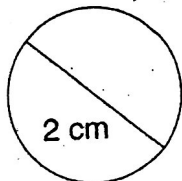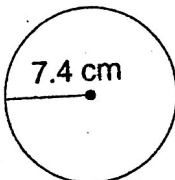
Find the area of each circle in terms of π.

6.

2 cm

_____

7.

7.4 cm

_____

8.

10 in.

_____

9.

22 mm

_____

10.

2.5 ft

_____

11.

6 m

_____
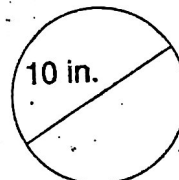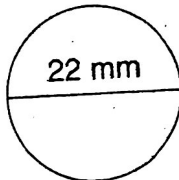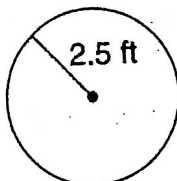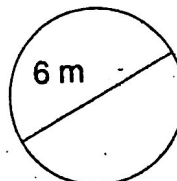
LESSON 12-2 Experimental Probability of Simple Events
Reteach

Experimental probability is an estimate of the probability that a particular event will happen.

It is called *experimental* because it is based on data collected from experiments or observations.

$$\text{Experimental probability} \approx \frac{\text{number of times a particular event happens}}{\text{total number of trials}}$$

JT is practicing his batting. The pitcher makes 12 pitches. JT hits 8 of the pitches. What is the experimental probability that JT will hit the next pitch?

- A favorable outcome is hitting the pitch.
- The number of favorable outcomes is the number JT hit: 8.
- The number of trials is the total number of pitches: 12.
- The experimental probability that JT will hit the next pitch is $\frac{8}{12} = \frac{2}{3}$.

---

1. Ramon plays outfield. In the last game, 15 balls were hit in his direction. He caught 12 of them. What is the experimental probability that he will catch the next ball hit in his direction?

   a. What is the number of favorable events? _____

   b. What is the total number of trials? _____

   c. What is the experimental probability that Ramon will catch the next ball hit in his direction?

   _____

2. In one inning Tori pitched 9 strikes and 5 balls. What is the experimental probability that the next pitch she throws will be a strike?

   a. What is the number of favorable events? _____

   b. What is the total number of trials? _____

   c. What is the experimental probability that the next pitch Tori throws will be a strike?

   _____

3. Tori threw 5 pitches for one batter. Kevin, the catcher, caught 4 of those pitches. What is the experimental probability that Kevin will **not** catch the next pitch? Show your work.

   _____

LESSON 12-2 Experimental Probability of Simple Events

Practice and Problem Solving: A/B

Solve.

1. Jolene is playing basketball. She scored 11 baskets in 15 free throws. What is the experimental probability that she will score a basket on her next free throw?

   _____

2. Sarah has gone to work for 60 days. On 39 of those days, she arrived at work before 8:30 A.M. On the rest of the days she arrived after 8:30 A.M. What is the experimental probability she will arrive after 8:30 A.M. on the next day she goes to work?

   _____

3. For the past four weeks, Micah has been recording the daily high temperature. During that time, the high temperature has been greater than 45°F on 20 out of 28 days. What is the experimental probability that the high temperature will be below 45°F on the twenty-ninth day?

   _____

4. After the movie premiere 99 out of 130 people surveyed said they liked the movie.

   a. What is the experimental probability that the next person surveyed will say he or she liked the movie?

      _____

   b. What is the experimental probability that the next person surveyed will say he or she did not like the movie?

      _____

Find each experimental probability. Write your answer as a fraction, as a decimal, and as a percent.

5. For the past 40 days, Naomi has been recording the number of customers at her restaurant between 10:00 A.M. and 11:00 A.M. During that hour, there have been fewer than 20 customers on 25 out of the 40 days.

   a. What is the experimental probability there will be fewer than 20 customers on the forty-first day?

      _____

   b. What is the experimental probability there will be 20 or more customers on the forty-first day?

      _____