

Multiply Decimals

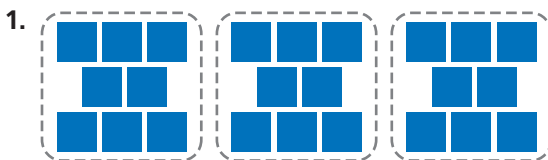
Show What You Know



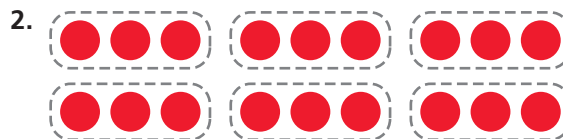
Check your understanding of important skills.

Name _____

► Meaning of Multiplication Complete.



_____ groups of _____ = _____



_____ groups of _____ = _____

► Decimals Greater Than One Write the word form and the expanded form for each.

3. 1.7

4. 5.62

► Multiply by 3-Digit Numbers Multiply.

5.
$$\begin{array}{r} 321 \\ \times 4 \\ \hline \end{array}$$

6.
$$\begin{array}{r} 387 \\ \times 5 \\ \hline \end{array}$$

7.
$$\begin{array}{r} 126 \\ \times 13 \\ \hline \end{array}$$

8.
$$\begin{array}{r} 457 \\ \times 35 \\ \hline \end{array}$$



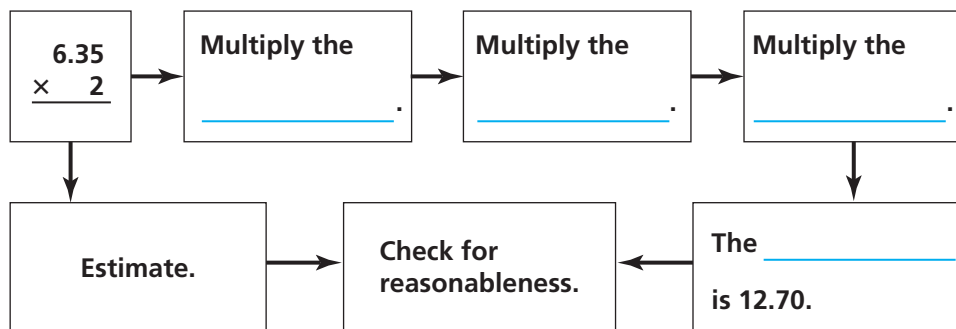
Staghorn Coral is a type of branching coral. It can add as much as 0.67 feet to its branches each year. Be a Math Detective and find how much a staghorn coral can grow in 5 years.



Vocabulary Builder

► Visualize It

Complete the Flow Map using the words with a ✓.



Review Words

decimal
expanded form
✓hundredths
multiplication
✓ones
pattern
place value
✓product
✓tenths
thousandths

► Understand Vocabulary

Read the description. What term do you think it describes?

1. It is the process used to find the total number of items in a given number of groups. _____
2. It is a way to write a number that shows the value of each digit. _____
3. It is one of one hundred equal parts. _____
4. This is the result when you multiply two numbers.

5. It is the value of a digit in a number based on the location of the digit. _____

Name _____

Multiplication Patterns with Decimals

Essential Question How can patterns help you place the decimal point in a product?



Cindy is combining equal-sized rectangles from different fabric patterns to make a postage-stamp quilt. Each rectangle has an area of 0.75 of a square inch. If she uses 1,000 rectangles to make the quilt, what will be the area of the quilt?



Use the pattern to find the product.

$$1 \times 0.75 = 0.75$$

$$10 \times 0.75 = 7.5$$

$$100 \times 0.75 = 75.$$

$$1,000 \times 0.75 = 750.$$

The quilt will have an area of _____ square inches.

- As you multiply by increasing powers of 10, how does the position of the decimal point change in the product? _____

Place value patterns can be used to find the product of a number and the decimals 0.1 and 0.01.

Example 1

Jorge is making a scale model of the Willis Tower in Chicago for a theater set. The height of the tower is 1,353 feet. If the model is $\frac{1}{100}$ of the actual size of the building, how tall is the model?

$$1 \times 1,353 = 1,353$$

$$0.1 \times 1,353 = 135.3$$

$$0.01 \times 1,353 = \text{ } \leftarrow \frac{1}{100} \text{ of } 1,353$$

Jorge's model of the Willis Tower is _____ feet tall.

- What fraction of the actual size of the building is the model?

- Write the fraction a decimal.

- As you multiply by decreasing powers of 10, how does the position of the decimal point change in the product?

Example 2

Three friends are selling items at an arts and crafts fair. Josey makes \$45.75 selling jewelry. Mark makes 100 times as much as Josey makes by selling his custom furniture. Chance makes a tenth of the money Mark makes by selling paintings. How much money does each friend make?



Josey: \$45.75

Mark: _____ \times \$45.75

Think: $1 \times \$45.75 =$ _____

$10 \times \$45.75 =$ _____

$100 \times \$45.75 =$ _____

Chance: _____ \times _____

Think: $1 \times$ _____ $=$ _____

_____ \times _____ $=$ _____

So, Josey makes \$45.75, Mark makes _____,
and Chance makes _____.

Try This! Complete the pattern.

A $10^0 \times 4.78 =$ _____

$10^1 \times 4.78 =$ _____

$10^2 \times 4.78 =$ _____

$10^3 \times 4.78 =$ _____

B $38 \times 1 =$ _____

$38 \times 0.1 =$ _____

$38 \times 0.01 =$ _____

Share and Show



Complete the pattern.

1. $10^0 \times 17.04 = 17.04$

$10^1 \times 17.04 = 170.4$

$10^2 \times 17.04 = 1,704$

$10^3 \times 17.04 =$ _____

Think: The decimal point moves one place to
the _____ for each increasing
power of 10.

Name _____


Complete the pattern.

2. $1 \times 3.19 =$ _____

$10 \times 3.19 =$ _____

$100 \times 3.19 =$ _____

$1,000 \times 3.19 =$ _____

 3. $45.6 \times 10^0 =$ _____

$45.6 \times 10^1 =$ _____

$45.6 \times 10^2 =$ _____

$45.6 \times 10^3 =$ _____

 4. $1 \times 6,391 =$ _____

$0.1 \times 6,391 =$ _____

$0.01 \times 6,391 =$ _____

Math Talk

MATHEMATICAL PRACTICES

Explain how you know that when you multiply the product of 10×34.1 by 0.1 , the result will be 34.1 .

On Your Own

Complete the pattern.

5. $1.06 \times 1 =$ _____

$1.06 \times 10 =$ _____

$1.06 \times 100 =$ _____

$1.06 \times 1,000 =$ _____

6. $1 \times 90 =$ _____

$0.1 \times 90 =$ _____

$0.01 \times 90 =$ _____

7. $10^0 \times \$0.19 =$ _____

$10^1 \times \$0.19 =$ _____

$10^2 \times \$0.19 =$ _____

$10^3 \times \$0.19 =$ _____

8. $580 \times 1 =$ _____

$580 \times 0.1 =$ _____

$580 \times 0.01 =$ _____

9. $10^0 \times 80.72 =$ _____

$10^1 \times 80.72 =$ _____

$10^2 \times 80.72 =$ _____

$10^3 \times 80.72 =$ _____

10. $1 \times 7,230 =$ _____

$0.1 \times 7,230 =$ _____

$0.01 \times 7,230 =$ _____



Algebra Find the value of n .

11. $n \times \$3.25 = \325.00

$n =$ _____

12. $0.1 \times n = 89.5$

$n =$ _____

13. $10^3 \times n = 630$

$n =$ _____

Problem Solving REAL WORLD



What's the Error?

14. Kirsten is making lanyards for a convention. She needs to make 1,000 lanyards and knows that 1 lanyard uses 1.75 feet of cord. How much cord will Kirsten need?

Kirsten's work is shown below.

$$1 \times 1.75 = 1.75$$

$$10 \times 1.75 = 10.75$$

$$100 \times 1.75 = 100.75$$

$$1,000 \times 1.75 = 1,000.75$$

Find and describe Kirsten's error.

Solve the problem using the correct pattern.



So, Kirsten needs _____ feet of cord to make 1,000 lanyards.

- **Describe** how Kirsten could have solved the problem without writing out the pattern needed.

Name _____

Multiply Decimals and Whole Numbers

Essential Question How can you use a model to multiply a whole number and a decimal?

Investigate

Materials ■ decimal models ■ color pencils

Giant tortoises move very slowly. They can travel a distance of about 0.17 mile in 1 hour. If it travels at the same speed, how far could a giant tortoise move in 4 hours?



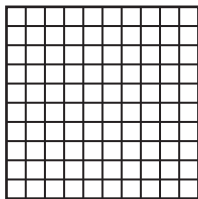
A. Complete the statement to describe the problem.

I need to find how many total miles are in _____ groups of _____.

- Write an expression to represent the problem. _____

B. Use the decimal model to find the answer.

- What does each small square in the decimal model represent?



C. Shade a group of _____ squares to represent the distance a giant tortoise can move in 1 hour.

D. Use a different color to shade each additional

group of _____ squares until you

have _____ groups of _____ squares.

E. Record the total number of squares shaded. _____ squares

So, the giant tortoise can move _____ mile in 4 hours.



Math Talk


MATHEMATICAL PRACTICES

Explain how the model helps you determine if your answer is reasonable.

Draw Conclusions

1. **Explain** why you used only one decimal model to show the product.

2. **Explain** how the product of 4 groups of 0.17 is similar to the product of 4 groups of 17. How is it different?

3.  **Compare** the product of 0.17 and 4 with each of the factors. Which number has the greatest value? **Explain** how this is different than multiplying two whole numbers.

Make Connections

You can draw a quick picture to solve decimal multiplication problems.

Find the product. 3×0.46

STEP 1 Draw 3 groups of 4 tenths and 6 hundredths.
Remember that a square is equal to 1.

STEP 2 Combine the hundredths and rename.

There are _____ hundredths. I will rename

_____ hundredths as _____.

Cross out the hundredths you renamed.

STEP 3 Combine the tenths and rename.

There are _____ tenths. I will rename

_____ tenths as _____.

Cross out the tenths you renamed.

STEP 4 Record the value shown by your completed quick picture.

So, $3 \times 0.46 =$ _____.

Math Talk

MATHEMATICAL PRACTICES

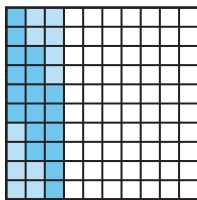
Explain how renaming decimals is like renaming whole numbers.

Name _____

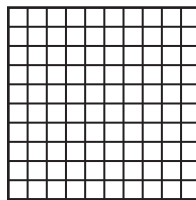
Share and Show


Use the decimal model to find the product.

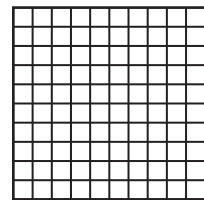
1. $5 \times 0.06 =$ _____



2. $2 \times 0.38 =$ _____



 3. $4 \times 0.24 =$ _____





Find the product. Draw a quick picture.

4. $4 \times 0.6 =$ _____

5. $2 \times 0.67 =$ _____

6. $3 \times 0.62 =$ _____

 7. $4 \times 0.32 =$ _____

8.  **Describe** how you solved Exercise 7 using place value and renaming. _____

Problem Solving **REAL WORLD**

Use the table for 9–11.

9. Each day a bobcat drinks about 3 times as much water as a Canada goose drinks. How much water can a bobcat drink in one day?



Water Consumption	
Animal	Average Amount (liters per day)
Canada Goose	0.24
Cat	0.15
Mink	0.10
Opossum	0.30
Bald Eagle	0.16

10. River otters drink about 5 times as much water as a bald eagle drinks in a day. How much water can a river otter drink in one day?

11. **Write Math** **Explain** how you could use a quick picture to find the amount of water that a cat drinks in 5 days.

12. **Test Prep** Jared has a parakeet that weighs 1.44 ounces. Susie has a Senegal parrot that weighs 3 times as much as Jared’s parakeet. How many ounces does Susie’s parrot weigh?

- (A) 0.32 ounce

(B) 0.43 ounce
- (C) 4.32 ounces

(D) 43.2 ounces

Name _____

Multiplication with Decimals and Whole Numbers

Essential Question How can you use drawings and place value to multiply a decimal and a whole number?

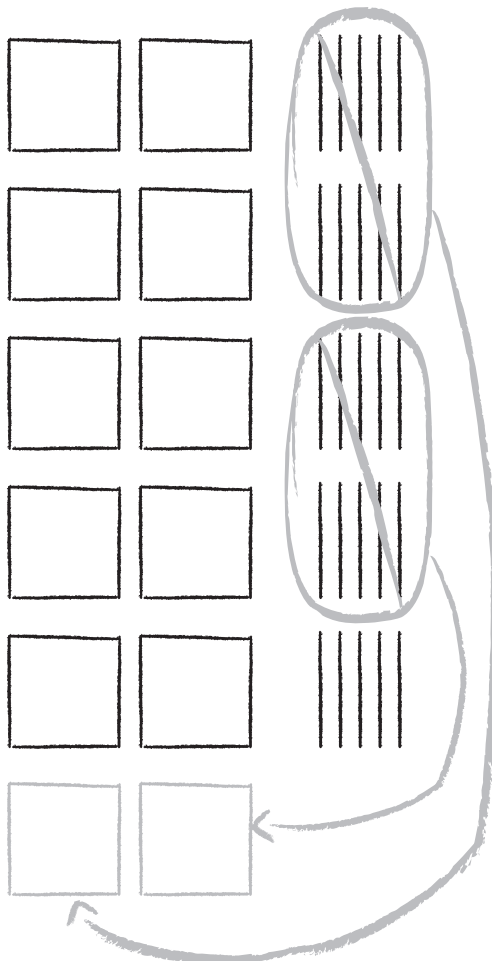


In 2010, the United States Mint released a newly designed Lincoln penny. A Lincoln penny has a mass of 2.5 grams. If there are 5 Lincoln pennies on a tray, what is the total mass of the pennies?

One Way Use place value.

Multiply. 5×2.5

MODEL



THINK AND RECORD

STEP 1 Estimate the product by rounding the decimal to the nearest whole number.

$$5 \times \underline{\quad} = \underline{\quad}$$

STEP 2 Multiply the tenths by 5.

$$\begin{array}{r} 2.5 \\ \times 5 \\ \hline \end{array} \leftarrow 5 \times 5 \text{ tenths} = 25 \text{ tenths, or 2 ones and 5 tenths}$$

STEP 3 Multiply the ones by 5.

$$\begin{array}{r} 2.5 \\ \times 5 \\ \hline 2.5 \\ \hline \end{array} \leftarrow 5 \times 2 \text{ ones} = 10 \text{ ones, or 1 ten}$$

STEP 4 Add the partial products.

$$\begin{array}{r} 2.5 \\ \times 5 \\ \hline 2.5 \\ + 10 \\ \hline \end{array}$$

So, 5 Lincoln pennies have a mass of _____ grams.

- How much mass does one penny have?
- How many pennies are on the tray?
- Use grouping language to describe what you are asked to find.

Math Talk

MATHEMATICAL PRACTICES

Explain how the estimate helps you determine if the answer is reasonable.



Another Way Use place value patterns.

Having a thickness of 1.35 millimeters, the dime is the thinnest coin produced by the United States Mint. If you stacked 8 dimes, what would be the total thickness of the stack?



Multiply. 8×1.35

STEP 1

Write the decimal factor as a whole number.

Think: $1.35 \times 100 = 135$

STEP 2

Multiply as with whole numbers.

STEP 3

Place the decimal point.

Think: 0.01 of 135 is 1.35.
Find 0.01 of 1,080 and record the product.

$$\begin{array}{r}
 1.35 \\
 \times 8 \\
 \hline
 ?
 \end{array}
 \xrightarrow{\times 100}
 \begin{array}{r}
 135 \\
 \times 8 \\
 \hline
 1,080
 \end{array}
 \xrightarrow{\times 0.01}
 \begin{array}{r}
 1.35 \\
 \times 8 \\
 \hline

 \end{array}$$

A stack of 15 dimes would have a thickness of _____ millimeters.

1. **Explain** how you know the product of 8×1.35 is greater than 8.

2. **What if** you multiplied 0.35 by 8? Would the product be less than or greater than 8? **Explain.**

Share and Show



Place the decimal point in the product.

1.
$$\begin{array}{r}
 6.81 \\
 \times 7 \\
 \hline
 4767
 \end{array}$$

Think: The place value of the decimal factor is hundredths.

2.
$$\begin{array}{r}
 3.7 \\
 \times 2 \\
 \hline
 74
 \end{array}$$

3.
$$\begin{array}{r}
 19.34 \\
 \times 5 \\
 \hline
 9670
 \end{array}$$

Name _____

Find the product.

$$\begin{array}{r} 4. \quad 6.32 \\ \times \quad 3 \\ \hline \end{array}$$

$$\begin{array}{r} 5. \quad 4.5 \\ \times \quad 8 \\ \hline \end{array}$$

$$\begin{array}{r} 6. \quad 40.7 \\ \times \quad 5 \\ \hline \end{array}$$

Math Talk

MATHEMATICAL PRACTICES

Explain how you can determine if your answer to Exercise 6 is reasonable.

On Your Own.....

Find the product.

$$\begin{array}{r} 7. \quad 4.93 \\ \times \quad 7 \\ \hline \end{array}$$

$$\begin{array}{r} 8. \quad 8.2 \\ \times \quad 6 \\ \hline \end{array}$$

$$\begin{array}{r} 9. \quad 0.49 \\ \times \quad 4 \\ \hline \end{array}$$

$$\begin{array}{r} 10. \quad 9.08 \\ \times \quad 9 \\ \hline \end{array}$$

$$\begin{array}{r} 11. \quad 7.55 \\ \times \quad 8 \\ \hline \end{array}$$

$$\begin{array}{r} 12. \quad 15.37 \\ \times \quad 5 \\ \hline \end{array}$$

Practice: Copy and Solve Find the product.

$$13. \quad 8 \times 7.2$$

$$14. \quad 3 \times 1.45$$

$$15. \quad 9 \times 8.6$$

$$16. \quad 6 \times 0.79$$

$$17. \quad 4 \times 9.3$$

$$18. \quad 7 \times 0.81$$

$$19. \quad 6 \times 2.08$$

$$20. \quad 5 \times 23.66$$

Problem Solving REAL WORLD

Use the table for 21–23.

21. Sari has a bag containing 6 half dollars. What is the weight of the half dollars in Sari's bag?
22. Felicia is running a game booth at a carnival. One of the games requires participants to guess the weight, in grams, of a bag of 9 dimes. What is the actual weight of the dimes in the bag?
23. **H.O.T.** Chance has \$2 in quarters. Blake has \$5 in dollar coins. Whose coins have the greatest weight? **Explain.**

24. **Write Math** Julie multiplies 6.27 by 7 and claims the product is 438.9. **Explain** without multiplying how you know Julie's answer is not correct. Find the correct answer.
25. **Test Prep** Every day on his way to and from school, Milo walks a total of 3.65 miles. If he walks to school 5 days, how many miles will Milo have walked?
- (A) 1.825 miles (C) 182.5 miles
(B) 18.25 miles (D) 1,825 miles



Coin	Weight (in grams)
Nickel	5.00
Dime	2.27
Quarter	5.67
Half Dollar	11.34
Dollar	8.1

SHOW YOUR WORK

Name _____

Multiply Using Expanded Form

Essential Question How can you use expanded form and place value to multiply a decimal and a whole number?



The length of a day is the amount of time it takes a planet to make a complete rotation on its axis. On Jupiter, there are 9.8 Earth hours in a day. How many Earth hours are there in 46 days on Jupiter?

You can use a model and partial products to solve the problem.



▲ A day on Jupiter is called a Jovian day.

One Way Use a model.

Multiply. 46×9.8

THINK

STEP 1

Rewrite the factors in expanded form, and label the model.

$$46 = \underline{\hspace{1cm}} + \underline{\hspace{1cm}}$$

$$9.8 = \underline{\hspace{1cm}} + \underline{\hspace{1cm}}$$

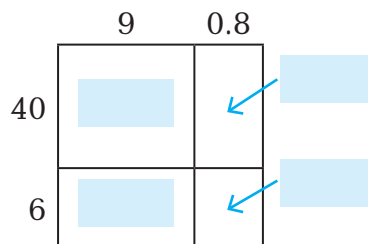
STEP 2

Multiply to find the area of each section. The area of each section represents a partial product.

STEP 3

Add the partial products.

MODEL



RECORD

$$\begin{array}{r}
 9.8 \\
 \times 46 \\
 \hline
 \boxed{} \leftarrow 40 \times 9 \\
 \boxed{} \leftarrow 40 \times 0.8 \\
 \boxed{} \leftarrow 6 \times 9 \\
 \boxed{} \leftarrow 6 \times 0.8 \\
 + \\
 \hline
 \boxed{}
 \end{array}$$

So, there are _____ Earth hours in 46 days on Jupiter.

1. **What if** you wanted to find the number of Earth hours in 125 days on Jupiter? How would your model change?



Another Way Use place value patterns.

A day on the planet Mercury lasts about 58.6 Earth days.
How many Earth days are there in 14 days on Mercury?

Multiply. 14×58.6

STEP 1

Write the decimal factor as a whole number.

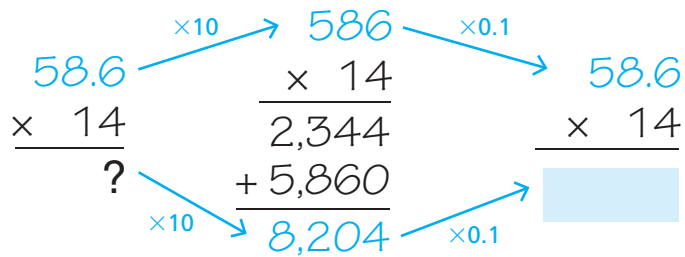
STEP 2

Multiply as with whole numbers.

STEP 3

Place the decimal point.

The decimal product is _____
of the whole number product.



▲ It takes Mercury 88 Earth days to complete an orbit of the Sun.

So, there are _____ Earth days in 14 days on Mercury.

2. **H.O.T.** What if you rewrite the problem as $(10 + 4) \times 58.6$ and used the Distributive Property to solve? **Explain** how this is similar to your

model using place value. _____

Try This! Find the product.

A Use a model.

$$52 \times 0.35 = \underline{\hspace{2cm}}$$

B Use place value patterns.

$$16 \times 9.18 = \underline{\hspace{2cm}}$$

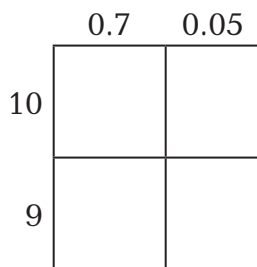
Name _____

Share and Show



Draw a model to find the product.

1. $19 \times 0.75 =$ _____



2. $27 \times 8.3 =$ _____

Find the product.

3. $18 \times 8.7 =$ _____

4. $23 \times 56.1 =$ _____

5. $47 \times 5.92 =$ _____

On Your Own

Draw a model to find the product.

6. $71 \times 8.3 =$ _____

7. $28 \times 0.19 =$ _____

Find the product.

8. $19 \times 0.65 =$ _____

9. $34 \times 98.3 =$ _____

10. $26 \times 16.28 =$ _____

Math Talk

MATHEMATICAL PRACTICES

Describe how you could use an estimate to determine if your answer to Exercise 3 is reasonable.

UNLOCK the Problem

REAL WORLD



11. While researching facts on the planet Earth, Kate learned that a true Earth day is about 23.93 hours long. How many hours are in 2 weeks on Earth?

a. What are you being asked to find?

b. What information do you need to know to solve the problem? _____

c. Write an expression to represent the problem to be solved. _____

d. Show the steps you used to solve the problem.

e. Complete the sentences.

On Earth, there are about _____

hours in a day, _____ days in 1 week,

and _____ days in two weeks.

Since _____ \times _____ =

_____, there are about

_____ hours in 2 weeks on Earth.

12. Michael's favorite song is 3.19 minutes long. If he listens to the song 15 times on repeat, how long will he have listened to the same song?

13. **Test Prep** A car travels 56.7 miles in an hour. If it continues at the same speed, how far will the car travel in 12 hours?

- (A) 68.004 miles
(B) 680.04 miles
(C) 680.4 miles
(D) 6,804 miles

Name _____

Problem Solving • Multiply Money

Essential Question How can the strategy *draw a diagram* help you solve a decimal multiplication problem?



A group of friends go to a local fair. Jayson spends \$3.75. Maya spends 3 times as much as Jayson. Tia spends \$5.25 more than Maya. How much does Tia spend?

Use the graphic organizer below to help you solve the problem.



Read the Problem

What do I need to find?

I need to find _____

_____.

What information do I need to use?

I need to use the amount spent by _____
to find the amount spent by _____ and
_____ at the fair.

How will I use the information?

I can draw a diagram to show _____

_____.

Solve the Problem

The amount of money Maya and Tia spend depends on the amount Jayson spends. Draw a diagram to compare the amounts without calculating. Then, use the diagram to find the amount each person spends.

Jayson \$3.75

Maya

Tia

Jayson: \$3.75

Maya: $3 \times$ _____ = _____

Tia: _____ + \$5.25 = _____

So, Tia spent _____ at the fair.



Try Another Problem

Julie's savings account has a balance of \$57.85 in January. By March, her balance is 4 times as much as her January balance. Between March and November, Julie deposits a total of \$78.45. If she does not withdraw any money from her account, what should Julie's balance be in November?



Read the Problem

What do I need to find?

What information do I need to use?

How will I use the information?

Solve the Problem

So, Julie's savings account balance will be

_____ in November.

- How does the diagram help you determine if your answer is reasonable? _____

Math Talk

MATHEMATICAL PRACTICES

Describe a different diagram you could use to solve the problem.

Name _____

Share and Show

1. Manuel collects \$45.18 for a fundraiser. Gerome collects \$18.07 more than Manuel. Cindy collects 2 times as much as Gerome. How much money does Cindy collect for the fundraiser?

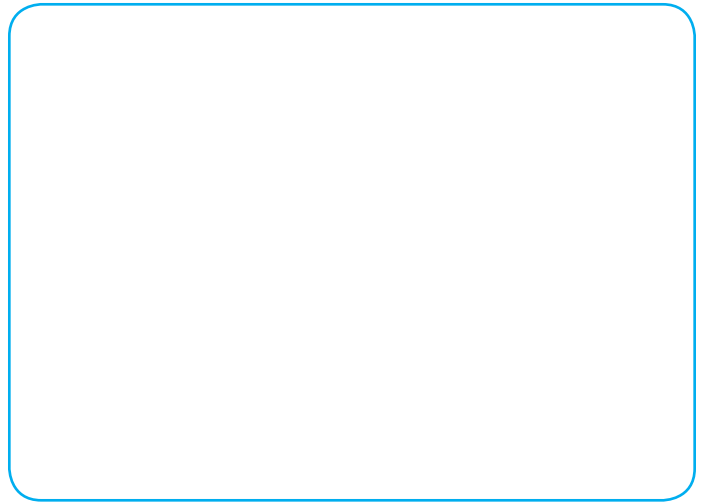
First, draw a diagram to show the amount Manuel collects.


Then, draw a diagram to show the amount Gerome collects.


Next, draw a diagram to show the amount Cindy collects.

Finally, find the amount each person collects.

Cindy collects _____ for the fundraiser.



-  2. **What if** Gerome collects \$9.23 more than Manuel? If Cindy still collects 2 times as much as Gerome, how much money would Cindy collect?

-  3. It costs \$5.15 to rent a kayak for 1 hour at a local state park. The price per hour stays the same for up to 5 hours of rental. After 5 hours, the cost is decreased to \$3.75 per hour. How much would it cost to rent a kayak for 6 hours?

4. Jenn buys a pair of jeans for \$24.99. Her friend Karen spends \$3.50 more for the same pair of jeans. Vicki paid the same price as Karen for the jeans but bought 2 pairs. How much did Vicki spend?

 **SHOW YOUR WORK**

On Your Own

Choose a STRATEGY

- Act It Out
- Draw a Diagram
- Make a Table
- Solve a Simpler Problem
- Work Backward
- Guess, Check, and Revise

Use the sign for 5–8.

5. Austin shops at Surfer Joe's Surf Shop before going to the beach. He buys 2 T-shirts, a pair of board shorts, and a towel. If he gives the cashier \$60, how much change will Austin get back?

6. Maria buys 3 T-shirts and 2 pairs of sandals at Surfer Joe's Surf Shop. How much does Maria spend?

7. Nathan receives a coupon in the mail for \$10 off of a purchase of \$100 or more. If he buys 3 pairs of board shorts, 2 towels, and a pair of sunglasses, will he spend enough to use the coupon? How much will his purchase cost?

8. **H.O.T.** Moya spends \$33.90 on 3 different items. If she did not buy board shorts, which three items did Moya buy?

9. **Test Prep** At a donut shop in town, each donut costs \$0.79. If Mr. Thomas buys a box of 8 donuts, how much will he pay for the donuts?

- (A) \$6.32
- (B) \$8.79
- (C) \$63.20
- (D) \$87.90



SHOW YOUR WORK

Name _____



Mid-Chapter Checkpoint

► Concepts and Skills

1. **Explain** how you can use a quick picture to find 3×2.7 . _____

Complete the pattern.

2. $1 \times 3.6 =$ _____

$10 \times 3.6 =$ _____

$100 \times 3.6 =$ _____

$1,000 \times 3.6 =$ _____

3. $10^0 \times 17.55 =$ _____

$10^1 \times 17.55 =$ _____

$10^2 \times 17.55 =$ _____

$10^3 \times 17.55 =$ _____

4. $1 \times 29 =$ _____

$0.1 \times 29 =$ _____

$0.01 \times 29 =$ _____

Find the product.

5.
$$\begin{array}{r} 3.14 \\ \times 8 \\ \hline \end{array}$$

6. 17×0.67

7. 29×7.3

Draw a diagram to solve.

8. Julie spends \$5.62 at the store. Micah spends 5 times as much as Julie. Jeremy spends \$6.72 more than Micah. How much money does each person spend?

Julie: \$5.62

Micah: _____

Jeremy: _____

Fill in the bubble completely to show your answer.

9. Sarah is cutting ribbons for a pep rally. The length of each ribbon needs to be 3.68 inches. If she needs 1,000 ribbons, what is the length of ribbon Sarah needs?
- ☐ (A) 3.68 inches
- ☐ (B) 36.8 inches
- ☐ (C) 368 inches
- ☐ (D) 3,680 inches
10. Adam is carrying books to the classroom for his teacher. Each book weighs 3.85 pounds. If he carries 4 books, how many pounds is Adam carrying?
- ☐ (A) 12.2 pounds
- ☐ (B) 13.2 pounds
- ☐ (C) 15.2 pounds
- ☐ (D) 15.4 pounds
11. A car travels 54.9 miles in an hour. If the car continues at the same speed for 12 hours, how many miles will it travel?
- ☐ (A) 54.9 miles
- ☐ (B) 549 miles
- ☐ (C) 658.8 miles
- ☐ (D) 6,588 miles
12. Charlie saves \$21.45 each month for 6 months. In the seventh month, he only saves \$10.60. How much money will Charlie have saved after 7 months?
- ☐ (A) \$150.15
- ☐ (B) \$139.30
- ☐ (C) \$128.70
- ☐ (D) \$118.10

Name _____

Decimal Multiplication

Essential Question How can you use a model to multiply decimals?

Investigate

Materials ■ color pencils

The distance from Charlene's house to her school is 0.8 mile. Charlene rides her bike 7 tenths of the distance and walks the rest of the way. How far does Charlene ride her bike to school?

You can use a decimal square to multiply decimals.

Multiply. 0.7×0.8

A. Draw a square with 10 equal columns.

- What decimal value does each column represent? _____

B. Using a color pencil, shade columns on the grid to represent the distance to Charlene's school.

- The distance to the school is 0.8 mile.

How many columns did you shade? _____

C. Divide the square into 10 equal rows.

- What decimal value does each row represent? _____

D. Using a different color, shade rows that overlap the shaded columns to represent the distance to school that Charlene rides her bike.

- What part of the distance to school does Charlene ride

her bike? _____

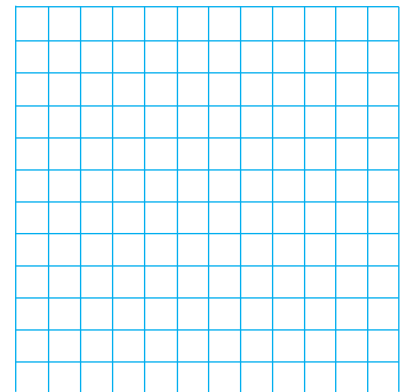
- How many rows of the shaded columns did you shade?

E. Count the number of squares that you shaded twice.

There are _____ squares. Each square represents _____.


Record the value of the squares as the product. $0.7 \times 0.8 =$ _____

So, Charlene rides her bike for _____ mile.



Draw Conclusions

- 1. Explain how dividing the decimal square into 10 equal columns and rows shows that tenths multiplied by tenths is equal to hundredths.

- 2.  **Comprehension** Why is the part of the model representing the product less than either factor?

Make Connections

You can use decimal squares to multiply decimals greater than 1.

Multiply. 0.3×1.4

STEP 1

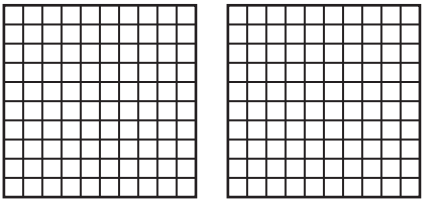
Shade columns to represent 1.4.
How many tenths are in 1.4?

STEP 2

Shade rows that overlap the shaded columns to represent 0.3.
How many rows of the shaded columns did you shade?

STEP 3

Count the number of squares that you shaded twice. Record the product at the right.



$0.3 \times 1.4 =$ _____

Math Talk

MATHEMATICAL PRACTICES

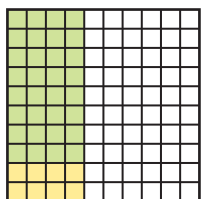
Explain why the product is less than only one of the decimal factors.

Name _____

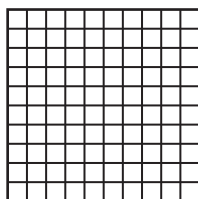
Share and Show

Multiply. Use the decimal model.

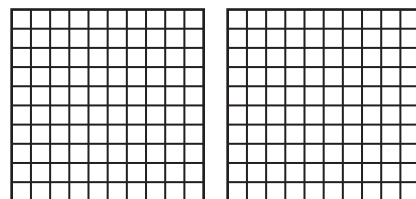
1. $0.8 \times 0.4 =$ _____



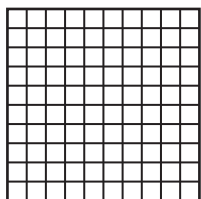
2. $0.1 \times 0.7 =$ _____



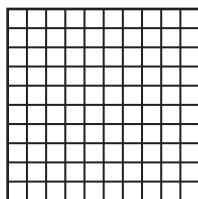
3. $0.4 \times 1.6 =$ _____



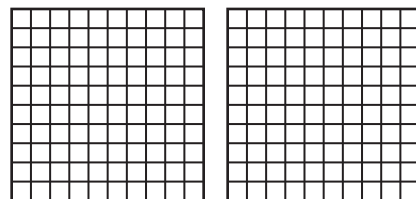
4. $0.3 \times 0.4 =$ _____



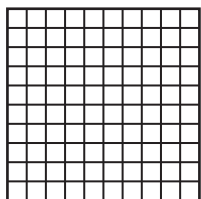
5. $0.9 \times 0.6 =$ _____



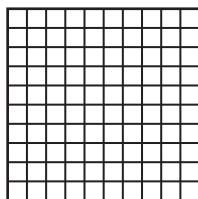
6. $0.5 \times 1.2 =$ _____



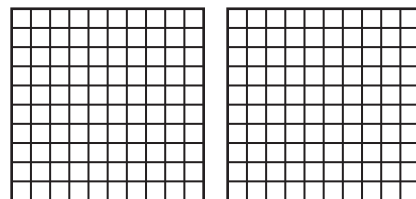
7. $0.8 \times 0.9 =$ _____




8. $0.5 \times 0.3 =$ _____



9. $0.5 \times 1.5 =$ _____



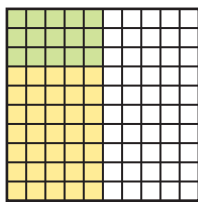
10.  **Write Math** Explain why when you multiply and find one tenth of one tenth, it is equal to one hundredth.



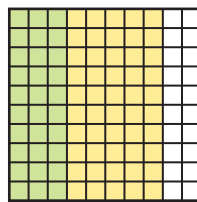
Sense or Nonsense?

11. Randy and Stacy used models to find 0.3 of 0.5. Both Randy's and Stacy's models are shown below. Whose model makes sense? Whose model is nonsense? **Explain** your reasoning below each model. Then record the correct answer.

Randy's Model



Stacy's Model



$$0.3 \times 0.5 = \underline{\hspace{2cm}}$$

- For the answer that is nonsense, describe the error the student made.

Name _____

Multiply Decimals

Essential Question What strategies can you use to place a decimal point in a product?

CONNECT You can use what you have learned about patterns and place value to place the decimal point in the product when you multiply two decimals.

$$1 \times 0.1 = 0.1$$

$$0.1 \times 0.1 = 0.01$$

$$0.01 \times 0.1 = 0.001$$

Remember

When a number is multiplied by a decimal, the decimal point moves one place to the left in the product for each decreasing place value being multiplied.

UNLOCK the Problem REAL WORLD

A male leopard seal is measured and has a length of 2.8 meters. A male elephant seal is about 1.5 times as long. What length is the male elephant seal?

Multiply. 1.5×2.8

One Way Use place value.

STEP 1

Multiply as with whole numbers.

STEP 2

Place the decimal point.

Think: Tenths are being multiplied by tenths.
Use the pattern 0.1×0.1 .

Place the decimal point so the value of the decimal is _____.

$$\begin{array}{r} 28 \xrightarrow{\times 0.1} 2.8 \text{ 1 place value} \\ \times 15 \xrightarrow{\times 0.1} \times 1.5 \text{ 1 place value} \\ \hline 140 \\ + 280 \\ \hline 420 \end{array}$$

1 + 1, or 2 place values

$\xrightarrow{\times 0.01}$

So, the length of a male elephant seal is about _____ meters.



- **What if** you multiplied 2.8 by 1.74? What would be the place value of the product? **Explain** your answer.



Another Way Use estimation.

You can use an estimate to place the decimal point in a product.

Multiply. 7.8×3.12

STEP 1

Estimate by rounding each factor to the nearest whole number.

$$\begin{array}{r} 7.8 \times 3.12 \\ \downarrow \quad \downarrow \end{array}$$

$$\underline{\quad} \times \underline{\quad} = \underline{\quad}$$

STEP 2

Multiply as with whole numbers.

STEP 3

Use the estimate to place the decimal point.

Think: The product should be close to your estimate.

$$7.8 \times 3.12 = \underline{\quad}$$

$$\begin{array}{r} 312 \\ \times 78 \\ \hline \end{array}$$

$$\begin{array}{r} 3.12 \\ \times 7.8 \\ \hline \end{array}$$

Share and Show

Place the decimal point in the product.


1.
$$\begin{array}{r} 3.62 \\ \times 1.4 \\ \hline 5068 \end{array}$$
 Think: A hundredth is being multiplied by a tenth. Use the pattern 0.01×0.1 .

2.
$$\begin{array}{r} 6.8 \\ \times 1.2 \\ \hline 816 \end{array}$$
 Estimate: $1 \times 7 = \underline{\quad}$

Find the product.

3.
$$\begin{array}{r} 0.9 \\ \times 0.8 \\ \hline \end{array}$$

4. 
$$\begin{array}{r} 84.5 \\ \times 5.5 \\ \hline \end{array}$$

5. 
$$\begin{array}{r} 2.39 \\ \times 2.7 \\ \hline \end{array}$$

Math Talk

MATHEMATICAL PRACTICES

Explain how you might know the place value of the product for Exercise 5 before you solve.

Name _____

On Your Own

Find the product.

6.
$$\begin{array}{r} 7.9 \\ \times 3.4 \\ \hline \end{array}$$

7.
$$\begin{array}{r} 9.2 \\ \times 5.6 \\ \hline \end{array}$$

8.
$$\begin{array}{r} 3.45 \\ \times 9.7 \\ \hline \end{array}$$

9.
$$\begin{array}{r} 45.3 \\ \times 0.8 \\ \hline \end{array}$$

10.
$$\begin{array}{r} 6.98 \\ \times 2.5 \\ \hline \end{array}$$

11.
$$\begin{array}{r} 7.02 \\ \times 3.4 \\ \hline \end{array}$$

12.
$$\begin{array}{r} 14.9 \\ \times 0.35 \\ \hline \end{array}$$

13.
$$\begin{array}{r} 50.99 \\ \times 3.7 \\ \hline \end{array}$$

14.
$$\begin{array}{r} 18.43 \\ \times 1.9 \\ \hline \end{array}$$

Practice: Copy and Solve Find the product.

15. 3.4×5.2

16. 0.9×2.46

17. 9.1×5.7

18. 4.8×6.01

19. 7.6×18.7

20. 1.5×9.34

21. 0.77×14.9

22. 3.3×58.14

Problem Solving

REAL WORLD

23. Charlie has an adult Netherlands dwarf rabbit that weighs 1.2 kilograms. Cliff's adult Angora rabbit weighs 2.9 times as much as Charlie's rabbit. How much does Cliff's rabbit weigh?

24. John has pet rabbits in an enclosure that has an area of 30.72 square feet. The enclosure Taylor is planning to build for his rabbits will be 2.2 times as large as John's. What will be the area of the enclosure Taylor is planning to build?

25. **H.O.T.** A zoo is planning a new building for the penguin exhibit. First, they made a model that was 1.3 meters tall. Then, they made a more detailed model that was 1.5 times as tall as the first model. The building will be 2.5 times as tall as the height of the detailed model. What will be the height of the building?

26. **Write Math** Leslie and Paul both solve the multiplication problem 5.5×4.6 . Leslie says the answer is 25.30. Paul says the answer is 25.3. Whose answer is correct? **Explain** your reasoning.

27. **Test Prep** A vine in Mr. Jackson's garden is 3.6 feet long. When it is measured again, it is 2.1 times as long. How long is the vine?

- (A) 5.7 feet (C) 7.5 feet
(B) 6.6 feet (D) 7.56 feet



 SHOW YOUR WORK

Name _____

Zeros in the Product

Essential Question How do you know you have the correct number of decimal places in your product?

UNLOCK the Problem REAL WORLD

CONNECT When decimals are multiplied, the product may not have enough digits to place the decimal point. In these cases, you may need to write additional zeros.

Students are racing typical garden snails and measuring the distance the snails travel in 1 minute. Chris's snail travels a distance of 0.2 foot. Jamie's snail travels 0.4 times as far as Chris's snail. How far does Jamie's snail travel?

Multiply. 0.4×0.2

STEP 1

Multiply as with whole numbers.

STEP 2

Determine the position of the decimal point in the product.

Since tenths are being multiplied by tenths, the product will show _____.

STEP 3

Place the decimal point.

Are there enough digits in the product to place the decimal point? _____

Write zeros, as needed, to the left of the whole number product to place the decimal point.

So, Jamie's snail travels a distance of _____ foot.

- Using the given information, describe what you are being asked to find.

$$\begin{array}{r}
 2 \xrightarrow{\times 0.1} 0.2 \quad 1 \text{ place value} \\
 \times 4 \xrightarrow{\times 0.1} \times 0.4 \quad 1 \text{ place value} \\
 \hline
 8 \xrightarrow{\times 0.01} \boxed{}8 \quad 1 + 1, \text{ or } 2 \text{ place values}
 \end{array}$$

Math Talk

MATHEMATICAL PRACTICES

Explain how you know when to write zeros in the product to place a decimal point.





Example Multiply money.

Multiply. $0.2 \times \$0.30$

STEP 1 Multiply as with whole numbers.

Think: The factors are 30 hundredths and 2 tenths.

What are the whole numbers you will multiply?

STEP 2 Determine the position of the decimal point in the product.

Since hundredths are being multiplied by tenths, the product will show _____.

STEP 3 Place the decimal point. Write zeros to the left of the whole number product as needed.

Since the problem involves dollars and cents, what place value should you use to show cents?

So, $0.2 \times \$0.30$ is _____.

$$\begin{array}{r} \$0.30 \\ \times \quad 0.2 \\ \hline \end{array}$$

Try This! Find the product.

$$0.2 \times 0.05 = \underline{\hspace{2cm}}$$

What steps did you take to find the product?

Math Talk

MATHEMATICAL PRACTICES

Explain why the answer to the Try This! can have a digit with a place value of hundredths or thousandths and still be correct.

Name _____

Share and Show



Write zeros in the product.

$$\begin{array}{r} 1. \quad 0.05 \\ \times 0.7 \\ \hline \end{array}$$

Think: Hundredths are multiplied by tenths. What should be the place value of the product?

$$\begin{array}{r} 2. \quad 0.2 \\ \times 0.3 \\ \hline \end{array}$$

$$\begin{array}{r} 3. \quad 0.02 \\ \times 0.2 \\ \hline \end{array}$$

Find the product.

$$\begin{array}{r} 4. \quad \$0.05 \\ \times 0.8 \\ \hline \end{array}$$

$$\begin{array}{r} 5. \quad 0.09 \\ \times 0.7 \\ \hline \end{array}$$

$$\begin{array}{r} 6. \quad 0.2 \\ \times 0.1 \\ \hline \end{array}$$

Math Talk

MATHEMATICAL PRACTICES

Explain why 0.04×0.2 has the same product as 0.4×0.02 .

On Your Own

Find the product.

$$\begin{array}{r} 7. \quad 0.3 \\ \times 0.3 \\ \hline \end{array}$$

$$\begin{array}{r} 8. \quad 0.05 \\ \times 0.3 \\ \hline \end{array}$$

$$\begin{array}{r} 9. \quad 0.02 \\ \times 0.4 \\ \hline \end{array}$$

$$\begin{array}{r} 10. \quad \$0.40 \\ \times 0.1 \\ \hline \end{array}$$

$$\begin{array}{r} 11. \quad 0.09 \\ \times 0.2 \\ \hline \end{array}$$

$$\begin{array}{r} 12. \quad \$0.05 \\ \times 0.6 \\ \hline \end{array}$$

$$\begin{array}{r} 13. \quad 0.04 \\ \times 0.5 \\ \hline \end{array}$$

$$\begin{array}{r} 14. \quad 0.06 \\ \times 0.8 \\ \hline \end{array}$$



Algebra Find the value of n .

$$15. \quad 0.03 \times 0.6 = n$$

$n =$ _____

$$16. \quad n \times 0.2 = 0.08$$

$n =$ _____

$$17. \quad 0.09 \times n = 0.063$$

$n =$ _____

UNLOCK the Problem

REAL WORLD

18. On an average day, a garden snail can travel about 0.05 mile. If a snail travels 0.2 times as far as the average distance in a day, how far can it travel?

(A) 0.7 mile
(B) 0.25 mile
(C) 0.1 mile
(D) 0.01 mile



- a. What are you being asked to find? _____
- b. What information will you use to solve the problem? _____

- c. How will you use multiplication and place value to solve the problem? _____

- d. Show how you will solve the problem.
- e. Fill in the bubble for the correct answer choice above.

19. In a science experiment, Tania uses 0.8 ounce of water to create a reaction. She wants the next reaction to be 0.1 times the size of the previous reaction. How much water should she use?

(A) 0.08 ounce
(B) 0.09 ounce
(C) 0.8 ounce
(D) 0.9 ounce

20. Michael multiplies 0.2 by a number. He records the product as 0.008. What number did Michael use?

(A) 0.016
(B) 0.04
(C) 0.28
(D) 0.4

Name _____



Chapter Review/Test

► Check Concepts

1. **Explain** how estimation helps you to place the decimal point when

multiplying 3.9×5.3 . _____

Complete the pattern.

2. $1 \times 7.45 =$ _____

$10 \times 7.45 =$ _____

$100 \times 7.45 =$ _____

$1,000 \times 7.45 =$ _____

3. $10^0 \times 376.2 =$ _____

$10^1 \times 376.2 =$ _____

$10^2 \times 376.2 =$ _____

$10^3 \times 376.2 =$ _____

4. $1 \times 191 =$ _____

$0.1 \times 191 =$ _____

$0.01 \times 191 =$ _____

Find the product.

5. $5 \times 0.89 =$ _____

6. $9 \times 2.35 =$ _____

7. $23 \times 8.6 =$ _____

8. $7.3 \times 0.6 =$ _____

9. $0.09 \times 0.7 =$ _____

10. $0.8 \times \$0.40 =$ _____

Draw a diagram to solve.

11. In January, Dawn earns \$9.25 allowance. She earns 3 times as much in February. If during March, she earns \$5.75 more than she did in February, how much allowance does Dawn earn in March?

Fill in the bubble completely to show your answer.

12. Janet hikes a trail at a local forest each day. The trail is 3.6 miles long, and she has hiked 5 days in the past week. How many miles has Janet hiked in the past week?
- ☐ (A) 18 miles
- ☐ (B) 15.3 miles
- ☐ (C) 11 miles
- ☐ (D) 8.6 miles
13. To earn money for his vacation, Grayson works at a local shop on weekends. His job is to cut bricks of fudge into 0.25 pound squares. If he cuts 36 equal-sized squares on Saturday, how many pounds of fudge has Grayson cut?
- ☐ (A) 7.25 pounds
- ☐ (B) 9 pounds
- ☐ (C) 90 pounds
- ☐ (D) 72.5 pounds
14. James is making a scale model of his bedroom. The model is 0.6 feet wide. If the actual room is 17.5 times as wide as the model, what is the width of James's room?
- ☐ (A) 18.1 feet
- ☐ (B) 17.11 feet
- ☐ (C) 16.9 feet
- ☐ (D) 10.5 feet
15. The cost of admission to the matinee showing at a movie theater is \$6.75. If 7 friends want to see the matinee showing of their favorite movie, how much will it cost?
- ☐ (A) \$11.25
- ☐ (B) \$14.75
- ☐ (C) \$42.75
- ☐ (D) \$47.25

Name _____

Fill in the bubble completely to show your answer.

16. On Friday, Gail talks for 38.4 minutes on her cell phone. On Saturday, she uses 5.5 times as many minutes as she did on Friday. How long does Gail talk on her cell phone on Saturday?
- (A) 2.112 minutes
(B) 21.12 minutes
(C) 211.2 minutes
(D) 2,112 minutes
17. Harry walks to a produce market to buy bananas. If a pound of bananas costs \$0.49, how much will Harry pay for 3 pounds of bananas?
- (A) \$1.47
(B) \$3.49
(C) \$5.49
(D) \$10.47
18. At Anne's Fabric Emporium, a yard of chiffon fabric costs \$7.85. Lee plans to purchase 0.8 yard for a craft project. How much money will Lee spend on chiffon fabric?
- (A) \$0.63
(B) \$6.28
(C) \$7.05
(D) \$8.65
19. Mitchell has \$18.79 in his savings account. Jeremy has 3 times as much as Mitchell. Maritza has \$4.57 more than Jeremy. How much money does Maritza have in her savings account?
- (A) \$13.71
(B) \$32.50
(C) \$56.37
(D) \$60.94

► **Constructed Response**

20. A river otter eats about 0.15 times its weight in food each day. At the Baytown Zoo, the male river otter weighs 5 pounds. About how much food will the otter at the zoo consume each day?
Explain how you found your answer.

► **Performance Task**

21. The cost of admission to the Baytown Zoo is shown below. Use the table to answer the questions.

Baytown Zoo Admission	
	(Cost per Person)
Senior Citizen	\$10.50
Adult	\$15.75
Child	\$8.25

- A** A family of 2 adults and 1 child plans to spend the day at the Baytown Zoo. How much does admission for the family cost?
Explain how you found your answer.

- B** **Describe** another way you could solve the problem.

- C** **What if** 2 more tickets for admission are purchased? If the two additional tickets cost \$16.50, determine what type of tickets the family purchases.
Explain how you can determine the answer without calculating.
