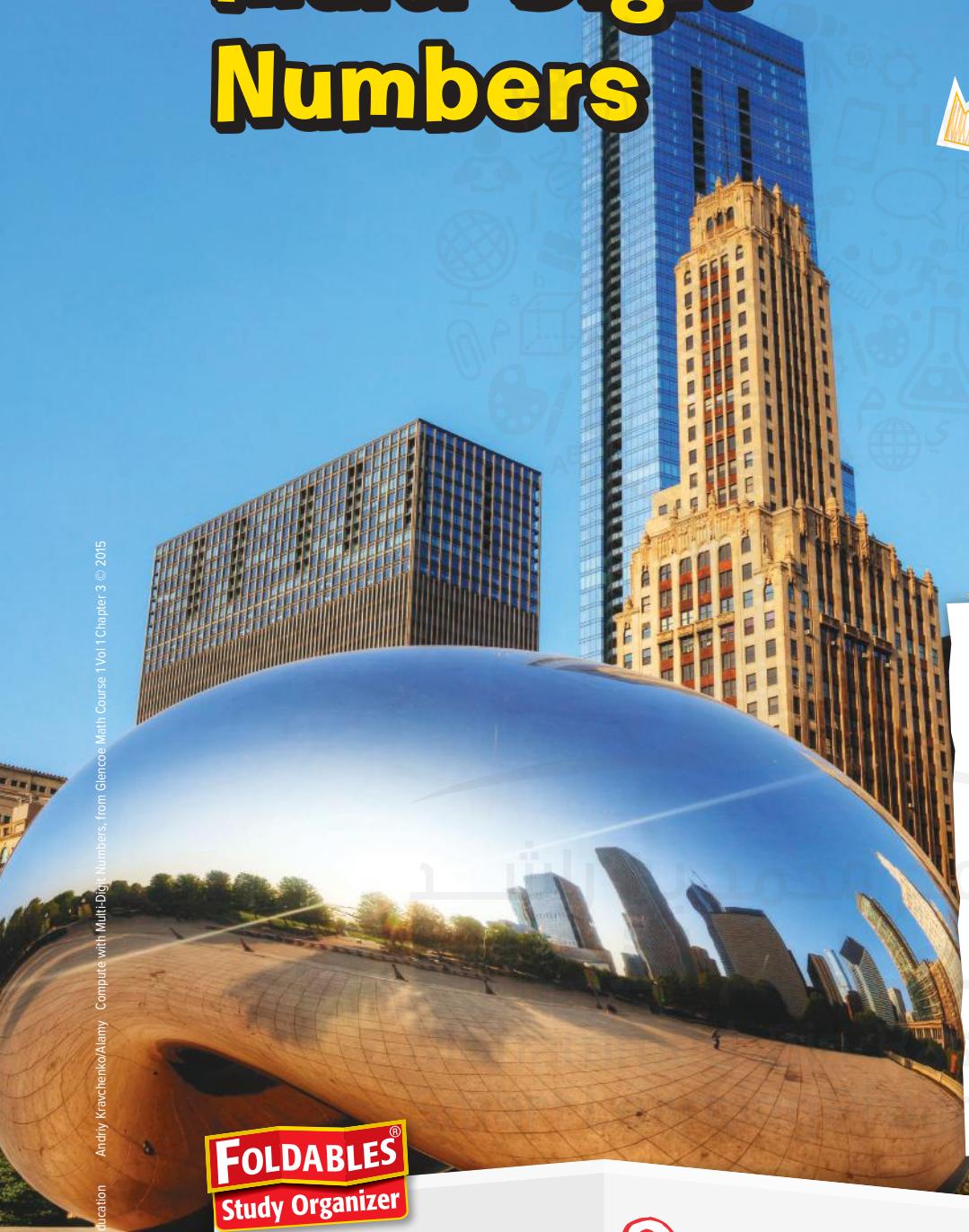


Chapter 3

Compute with Multi-Digit Numbers



FOLDABLES® Study Organizer



1 Cut out the Foldable in the back of this book.



2 Place your Foldable on page 250.



Essential Question

HOW can estimating be helpful?

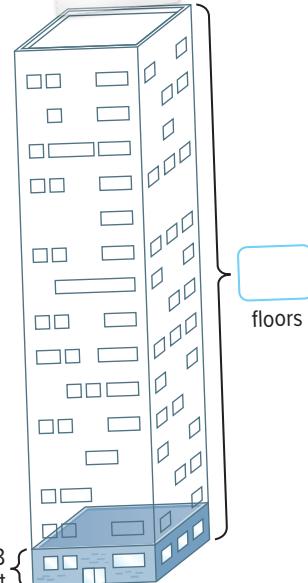
MP Mathematical Practices

1, 2, 3, 4, 5, 6



Math in the Real World

Skyscrapers A certain skyscraper in Chicago has 1,200,000 square feet of space. On average, there are 29,268 square feet of space on each floor. Estimate to find the number of floors in the building.



3 Use the Foldable throughout this chapter to help you learn about computing with multi-digit numbers.

What Tools Do You Need?

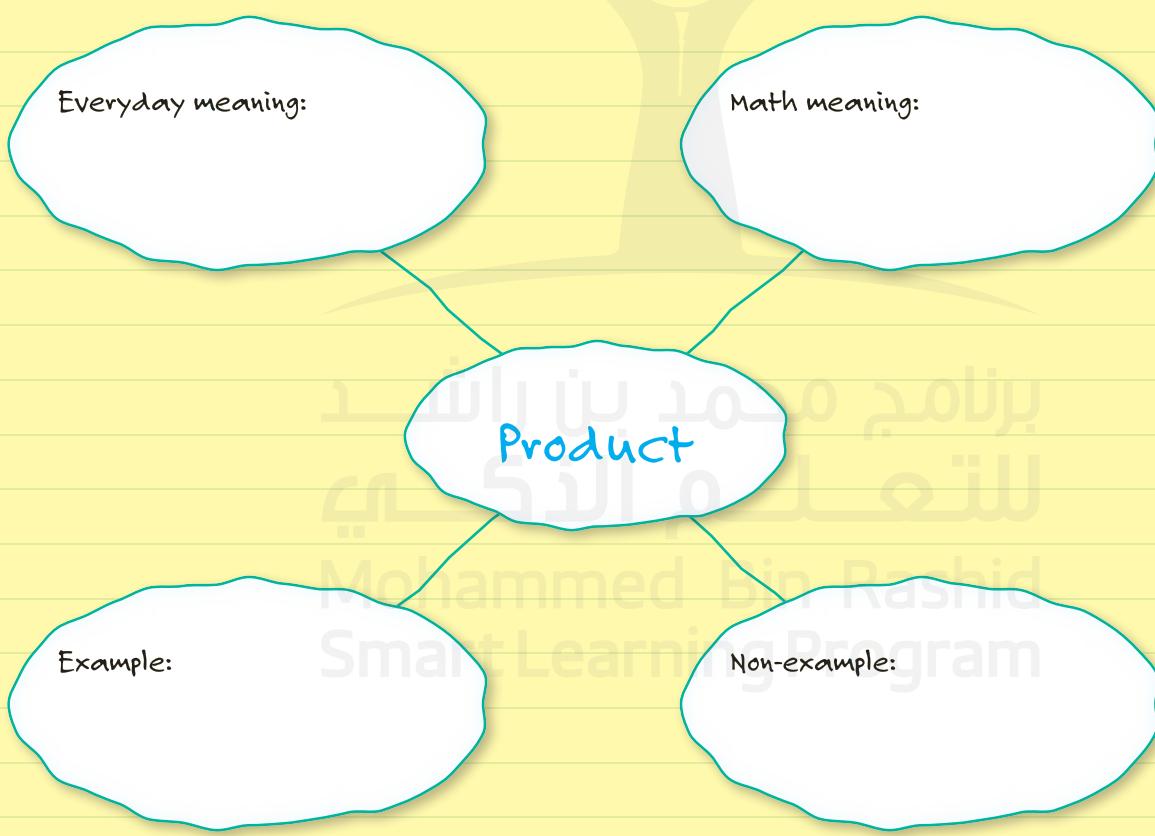


Vocabulary

compatible numbers

Review Vocabulary

Graphic Organizer One way to remember vocabulary terms is to connect them to an everyday meaning or an example. Use this information to complete the graphic organizer.



What Do You Already Know?

List three things you already know about multi-digit numbers in the first section. Then list three things you would like to learn about multi-digit numbers in the second section.

Compute with Multi-Digit Numbers

What I know

What I want to find out

When Will You Use This?

Here is an example of how multi-digit numbers are used in the real world.

Activity Use the Internet to find the cost of something that you really want. Describe a plan that you could use to save the money needed to buy it.

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Are You Ready?

Try the Quick Check below.



Quick Review

Example 1

Find 13×15 .

$$\begin{array}{r} 13 \\ \times 15 \\ \hline 65 \\ + 130 \\ \hline 195 \end{array}$$

Multiply the ones.
Multiply the tens.
Add.

Example 2

Find $323 \div 17$.

$$\begin{array}{r} 19 \\ 17 \overline{)323} \\ -17 \\ \hline 153 \\ -153 \\ \hline 0 \end{array}$$

Divide the tens.

Divide the ones.

Quick Check

Multiply Find each product.

1. $15 \times 20 =$ _____

2. $19 \times 51 =$ _____

3. $49 \times 22 =$ _____



Divide Find each quotient.

4. $112 \div 8 =$ _____

5. $539 \div 11 =$ _____

6. $779 \div 19 =$ _____

7. A musician sold 64 million albums in 16 months. He sold the same amount in each month. How many albums did he sell in each month?

How Did You Do?

Which problems did you answer correctly in the Quick Check?
Shade those exercise numbers below.

1 2 3 4 5 6 7

Add and Subtract Decimals



Real-World Link

Swimming One event in competitive swimming is the men's 100-meter butterfly. The table shows the times of different swimmers at a recent Olympics.

Men's 100-Meter Butterfly

Swimmer's	Time (s)
L. Trickett	56.73
C. Magnuson	?
G. Silva	58.10

You can use place value charts to compare the results.

- It took C. Magnuson 0.37 second longer to finish than L. Trickett. What was Magnuson's time, in seconds?
- At a high school meet, a swimmer swam the women's 100-meter butterfly in 72.34 seconds. How many seconds faster did G. Silva swim his race?

tens	ones	tenths	hundredths
5	6	7	3
+	0	3	7

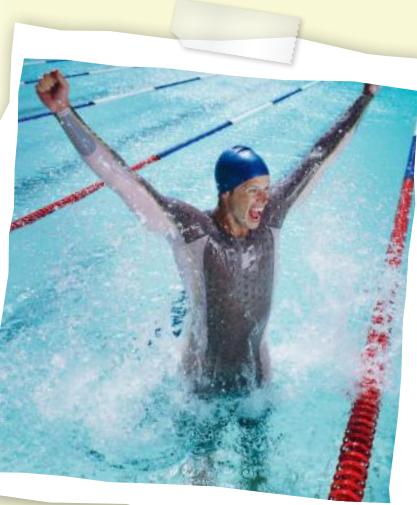
tens	ones	tenths	hundredths
7	2	3	4
-	5	8	1



Essential Question

HOW can estimating be helpful?

MP Mathematical Practices
1, 2, 3, 4, 5, 6



Which **MP** Mathematical Practices did you use?

Shade the circle(s) that applies.

- ① Persevere with Problems
- ② Reason Abstractly
- ③ Construct an Argument
- ④ Model with Mathematics
- ⑤ Use Math Tools
- ⑥ Attend to Precision
- ⑦ Make Use of Structure
- ⑧ Use Repeated Reasoning

Add Decimals

To add decimals, line up the decimal points. Then, add digits in the same place-value position.

Accuracy

To find an accurate sum or difference, line up the digits based on their place values. Use the decimal point to help align the correct digits before completing the operation.

Examples

1. Find the sum of 23.1 and 5.8.

Estimate $23.1 + 5.8 \approx 23 + 6$ or 29

$$\begin{array}{r} 23.1 \\ + 5.8 \\ \hline 28.9 \end{array}$$

Line up the decimal points.
Add as with whole numbers.

Check for Reasonableness $28.9 \approx 29$ ✓

The sum of 23.1 and 5.8 is 28.9.

2. Find the sum of 29.6 and 14.7.

Estimate $29.6 + 14.7 \approx \boxed{} + \boxed{}$ or $\boxed{}$

$$\begin{array}{r} \boxed{} \quad \boxed{} \quad . \quad \boxed{} \\ + \boxed{} \quad \boxed{} \quad . \quad \boxed{} \\ \hline \boxed{} \quad \boxed{} \quad . \quad \boxed{} \end{array}$$

Line up the decimal points.
Add as with whole numbers.

Check for Reasonableness $\boxed{} \approx \boxed{}$

The sum of 29.6 and 14.7 is $\boxed{}$.

a. _____

b. _____

c. _____

Got it? Do these problems to find out.

Find each sum.

a. $54.7 + 21.4$

b. $14.2 + 23.5$

c. $17.3 + 33.5$

Subtract Decimals

To subtract decimals, line up the decimal points. Then, subtract digits in the same place-value position. You may need to *annex*, or place zeros at the end of a decimal, in order to subtract.

Examples

3. Find the difference of 5.774 and 2.371.

Estimate $5.774 - 2.371 \approx 6 - 2 \text{ or } 4$

$$\begin{array}{r} 5.774 \\ - 2.371 \\ \hline 3.403 \end{array}$$

Line up the decimal points.
Subtract as with whole numbers.

Check for Reasonableness $3.403 \approx 4$ ✓

So, $5.774 - 2.371 = 3.403$.

4. Find $6 - 4.78$.

Estimate $6 - 4.78 \approx 6 - 5 \text{ or } 1$

$$\begin{array}{r} 6.00 \\ - 4.78 \\ \hline 1.22 \end{array}$$

Annex zeros so that both numbers have the same number of decimal places.

Check for Reasonableness $1.22 \approx 1$ ✓

So, $6 - 4.78 = 1.22$.

5. Find $23 - 4.216$.

$$\begin{array}{r} \boxed{} \boxed{} . \boxed{} \boxed{} \boxed{} \\ - \boxed{} . \boxed{} \boxed{} \boxed{} \\ \hline \boxed{} \boxed{} . \boxed{} \boxed{} \boxed{} \end{array}$$

Annex the zeros so that both numbers have the same number of decimal places.

Subtract as with whole numbers.

So, $23 - 4.216 = \underline{\hspace{2cm}}$.

Got it? Do these problems to find out.

Find each difference.

d. $9.543 - 3.671$ e. AED $50.62 - \text{AED}39.81$
f. $14 - 9.09$



d. _____

e. _____

f. _____



Example



6. Ahmad is creating a video. The first video clip was 22.36 minutes long. The second video clip was 17.03 minutes long. What is the total length of the video?

Estimate $22.36 + 17.03 \approx 22 + 17$ or 39

$$\begin{array}{r} 22.36 \\ + 17.03 \\ \hline 39.39 \end{array}$$

Line up the decimal points.
Add as with whole numbers.

Check for reasonableness $39.39 \approx 39$ ✓

So, the video is 39.39 minutes long.



9. _____

Got it? Do this problem to find out.

g. Ammar is traveling for work. This morning his GPS indicated that the total distance to his destination is 589.4 kilometers. Before lunch he drove 208.62 kilometers. How much farther does Ammar need to travel?

Guided Practice



Find each sum or difference. (Examples 1–5)

1. $14.7 + 87.9 =$ _____



2. $66.5 - 24.1 =$ _____

3. $52.1 - 31.47 =$ _____

4. Abdalla is making a snack mix for his family camping trip. He added 14.52 ounces of peanuts to 27.35 ounces of granola. How many ounces of snack mix does he have?

(Example 6)

5. **Building on the Essential Question** How is estimation helpful when adding and subtracting decimals?

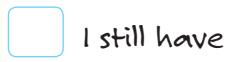
Rate Yourself!



I understand how to add and subtract decimals.



Great! You're ready to move on!



I still have questions about adding and subtracting decimals.

Independent Practice

Find each sum. (Examples 1 and 2)

1. $7.2 + 9.5 =$ _____



2. $1.34 + 2 =$ _____

3. $54.5 + 48.51 =$ _____

Find each difference. (Examples 3–5)

4. $5.6 - 3.5 =$ _____

5. $97 - 16.98 =$ _____

6. $58.67 - 28.72 =$ _____

7. The table shows the top three finishers in barrel racing. What is the time difference between Ahmed and Salman? (Example 6)

Barrel Racing Results	
Rider	Time (s)
Ahmed	14.67
Samy	15.98
Salman	16.40

8. In two months, Maha spent a total of AED 305.43 on groceries. She spent AED 213.20 in the first month. How much did she spend in the second month? (Example 6)

9. **Financial Literacy** A hat costs AED 10.95 and a T-shirt costs AED 14.20. How much change will you receive if you pay for both items with a AED 50 bill?

10. **MP Use Math Tools** The 4-by-100 meter relay is a track and field event involving four Jamaican runners on each team.

a. What is the combined time of Carter and Frater?

b. How much faster did Powell run his leg of the race than Bolt?

c. What is the combined time of all the runners?

4 by 100 Meter Times	
Runner	Time (s)
Carter	13.4
Frater	12
Bolt	12
Powell	11.7



H.O.T. Problems Higher Order Thinking

11. **MP Find the Error** Sultan is finding $8.9 - 3.72$. Find his mistake and correct it.

$$\begin{array}{r} 8.9 \\ - 3.72 \\ \hline 5.22 \end{array}$$



12. **MP Reason Abstractly** Write two different pairs of decimals whose sums are 14.1. One pair should involve regrouping.

13. **MP Reason Inductively** Explain how you know that the sum of 12.6, 3.1, and 5.4 is greater than 20.

14. **MP Persevere with Problems** Ayesha found that $3.28 + 3.28 + 3.28 = 9.84$. What is the missing factor in the related multiplication problem $3.28 \times \square = 9.84$? Explain.

15. **MP Reason Abstractly** Without subtracting $8.5 - 4.64$, determine what digit will be in the hundredths place. Explain.

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16. **MP Reason Inductively** Hind is buying the items shown at the right for her kitchen. Will AED 35 be enough to purchase all three items? Explain your reasoning.

Item	Cost (AED)
mixing bowl	14.95
spatula	8.49
measuring cups	10.75

Extra Practice

Find each sum.

17. $4.9 + 3.0 =$ 7.9



$$\begin{array}{r}
 4.9 \\
 +3.0 \\
 \hline
 7.9
 \end{array}$$

18. $0.796 + 13 =$ _____

19. $15.63 + 24.36 =$ _____

Find each difference.

20. $19.86 - 4.94 =$ _____

21. $82 - 67.18 =$ _____

22. $14.39 - 12.16 =$ _____

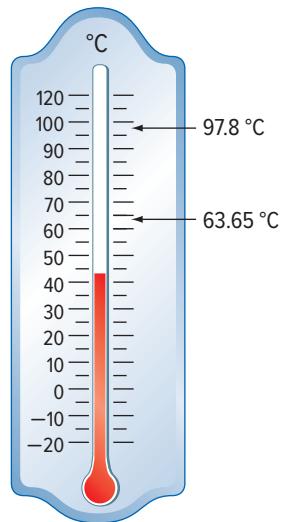
23. **Financial Literacy** The current balance of Mohamad's checking account is AED 237.80. Find the new balance after Mohamad writes a check for AED 29.95.



24. The annual rainfall for Kayston Falls was 50.38 inches in 2012. In 2013, the annual rainfall was 55.76 inches. What is the difference in rainfall between the two years?

25. **STEM** The melting point of sodium is 97.8 degrees Celsius. The melting point of potassium is 63.65 degrees Celsius. How much higher is the melting point of sodium?

26. **MP Be Precise** Omar needs three wooden boards to repair his porch. The lengths he needs are 2.2 meters, 2.82 meters, and 4.25 meters. He purchases a board that is 10 meters long and cuts the three sections. How much of the board that Omar purchased will be left?



Power Up! Test Practice

27. Marwa is traveling through City B. He drove 66.4 kilometers from City B to City A and then continued to City C. The total distance of his trip was 233.25 kilometers. What is the distance from City A to City C?

28. The table shows the top four finishers at a swimming event.

Boy's 50 Yard Freestyle	
Swimmer	Time (s)
Khalid	22.63
Tareq	22.20
Ali	22.58
Ahmed	22.31

Determine if each statement is true or false.

a. Ahmed swam 0.32 seconds faster than Khalid. True False

b. Ali swam 0.27 seconds faster than Ahmed. True False

c. Khalid swam 0.5 seconds slower than Ali. True False

d. Ahmed swam 0.11 seconds slower than Tareq. True False

Spiral Review

Round each decimal to the nearest whole number.

29. $4.75 \approx$ _____

30. $34.1 \approx$ _____

31. $22.48 \approx$ _____

32. Plot the number 2.78 on the number line below.



33. The table shows the distances Badria biked several days this week. Which day of the week did she bike the greatest distance?

Day	Distance Biked (mi)
Monday	9.34
Wednesday	9.47
Thursday	9.74
Sunday	9.32

Estimate Products



Real-World Link

Skateboarding The record for the greatest distance traveled on skateboard in 24 hours was set in a recent year by Omar. He traveled about 7.6 miles per hour.

1. Plot 7.6 on the number line.



2. What whole number is 7.6 closest to?
3. Estimate how many miles Omar traveled in 24 hours.
 $\boxed{} \times \boxed{} = \underline{\hspace{2cm}}$
4. Is your estimate higher or lower than the actual distance he traveled? Explain.

5. A new record was set later by Sameh. He traveled about 10.1 miles per hour for 24 hours. About how much farther did Sameh travel?

$$\boxed{} \times 24 = \underline{\hspace{2cm}}$$

$$\boxed{} - \boxed{} = \underline{\hspace{2cm}}$$

So, Sameh traveled about miles farther.

Which **MP** Mathematical Practices did you use?
 Shade the circle(s) that applies.

① Persevere with Problems	⑤ Use Math Tools
② Reason Abstractly	⑥ Attend to Precision
③ Construct an Argument	⑦ Make Use of Structure
④ Model with Mathematics	⑧ Use Repeated Reasoning



Essential Question

HOW can estimating be helpful?

MP Mathematical Practices
 1, 2, 3, 4, 5



Estimate Products Using Rounding

To estimate products of decimals, round each number. First underline the digit to be rounded. Then look at the digit to the right of the place being rounded.

- If the digit is 4 or less, the underlined digit remains the same.
- If the digit is 5 or greater, add 1 to the underlined digit.
- After rounding, all place values to the right of the underlined digit have a value of zero.

After the numbers are rounded, multiply.

Examples

1. Estimate 8.7×2.8 .

Round to the nearest whole number to make it easier to compute mentally.

$$\begin{array}{r}
 8.7 \\
 \times 2.8 \\
 \hline
 \end{array}
 \quad
 \begin{array}{r}
 9 \\
 \times 3 \\
 \hline
 27
 \end{array}
 \quad
 \begin{array}{l}
 \text{Round 8.7 to 9.} \\
 \text{Round 2.8 to 3.}
 \end{array}$$

The product is about 27.

2. Estimate 42.6×37.2 .

Round to the greatest place value to make it easier to compute mentally.

42.6	≈	
37.2	≈	
x		

a. _____

b

C. _____

Got it? Do these problems to find out.

Estimate each product.

a. 9.6×1.8

b. 4.2×3.1

c. 68.4×21.3



Examples

3. A greyhound can travel 69.3 kilometers per hour. At this speed, about how far could a greyhound travel in 6.5 hours?

$$\begin{array}{r}
 69.3 \quad \rightarrow \quad 70 \quad \text{Round 69.3 to 70.} \\
 \times 6.5 \quad \rightarrow \quad \times 7 \quad \text{Round 6.5 to 7.} \\
 \hline
 280
 \end{array}$$

The greyhound could travel about 490 kilometers in 6.5 hours.

4. Suppose one Dirham is equal to 5.8 pounds of a certain country. About how many pounds would you receive for AED 48.50?

Round to the greatest place value to make it easier to compute mentally.

$$\begin{array}{r}
 5.8 \approx \boxed{} \\
 48.50 \approx \boxed{} \\
 & \boxed{} \quad \boxed{} \\
 & \times \quad \boxed{} \\
 & \boxed{} \quad \boxed{}
 \end{array}$$

Multiply.

So, AED 48.50 is equal to about pounds.

Got it? Do these problems to find out.

d. **STEM** Earth is rotating around the Sun about 29.8 kilometers per second. About how many kilometers does it travel in 4.8 seconds?

e. The average walking speed of a person is 4.8 kilometers per hour. Estimate the number of kilometers you could walk in 3 hours.

f. **STEM** A King Palm can grow about 2.1 feet a year. Estimate the height of the King Palm, in yards, after 15 years.



STOP and Reflect

You could estimate 18.76×5 by multiplying 19×5 or by multiplying 20×5 . Which answer will be more exact? Explain below.

Show your work.

d. _____

e. _____

f. _____



Example

5. Amani has AED 20 to buy 5 binders. Binders cost AED 4.29 each. Does she have enough money? Explain your reasoning.

Estimate.

$$5 \times \text{AED } 4 = \text{AED } 20 \quad \text{Estimate 4.29 as 4.}$$

$$5 \times \text{AED } 5 = \text{AED } 25 \quad \text{Estimate 4.29 as 5.}$$

The actual cost is between AED 20 and AED 25. So, Amani does not have enough money to buy the binders.



Guided Practice



Estimate each product. (Examples 1 and 2)

1. $5.8 \times 4 \approx$ _____



2. $13.92 \times 2.7 \approx$ _____

3. $94.89 \times 3.11 \approx$ _____

4. **Financial Literacy** A grocery store sells cheese for AED 3.89 per kilogram.

About how much would 1.89 kilogram of the cheese cost?

(Examples 3 and 4)

5. Mohamad has 52 megabytes left on his MP3 player. He wants to download 7 songs that each use 7.9 megabytes of memory. He estimates that he will need 56 megabytes of memory. Is his estimate reasonable? Explain your reasoning. (Example 5)

6.  **Building on the Essential Question** How do you determine which place value to use when estimating products?

Rate Yourself!

How confident are you about estimating products? Check the box that applies.



Independent Practice

Estimate each product. (Examples 1 and 2)

1. $9.7 \times 3.3 \approx$ _____



2. $3.4 \times 5.6 \approx$ _____

3. $17.5 \times 8.4 \approx$ _____

4. $44.8 \times 5.1 \approx$ _____

5. $28.21 \times 8.02 \approx$ _____

6. $71.92 \times 2.01 \approx$ _____

7. Suppose that the UAE produces 36.5 million tons of fruit each year. About how much fruit does it produce in 2.25 years? (Examples 3 and 4)

8. Asil is making headbands using ribbon. She would like to make 12 headbands. Each one requires 15.5 inches of ribbon. She estimates that she will need to buy 160 inches of ribbon. Is her estimate reasonable? Explain your reasoning. (Example 5)

9. **Financial Literacy** Ahmed's hourly wage at the ice cream shop is AED 58.50. The table shows the number of hours he worked. He estimates his earnings to be AED 1200. Without calculating his actual earnings, determine if his estimate is more or less than his actual earnings. Explain your reasoning.

Day	Hours Worked
Sunday	3.5
Monday	4.25
Tuesday	3.75
Wednesday	2.5
Thursday	4.75

10. **STEM** A car releases 19.6 pounds of carbon dioxide for every 1 gallon of gasoline burned. Estimate the number of pounds of carbon dioxide released if 14.5 gallons are burned.

11. **MP Model with Mathematics** Refer to the graphic novel frame below for Exercises a–b.



- How much more does Tareq need until he has enough to buy the video game system? _____
- Tareq estimates that if he works for 20 hours, he will have enough to buy the video game system. Is he correct? Explain. _____



H.O.T. Problems Higher Order Thinking

12. **MP Reason Abstractly** Name three decimals with a product that is about 40.

13. **MP Persevere with Problems** A scooter can travel between 22 and 28 miles on each gallon of petrol. If one gallon of petrol costs between AED 3.75 and AED 3.95 per gallon, about how much will it cost to travel 75 miles? _____



14. **MP Justify Conclusions** Suppose your friend multiplied 1.2 and 2.6 and got 31.2 as the product. Is your friend's answer reasonable? Justify your response.

15. **MP Reason Inductively** Green peppers are on sale for AED 2.89 per kilogram. Mrs. Nahla bought 1.75 kilograms of peppers. Is it more reasonable to say that she spent between AED 5 and AED 6 or between AED 6 and AED 7 on the peppers? Explain your reasoning.

Extra Practice

Estimate each product.

16. $26.3 \begin{array}{r} \rightarrow \\ \times 9.7 \end{array} \begin{array}{r} 26 \\ \rightarrow \\ 26 \times 10 = 260 \end{array}$



17. $33.6 \begin{array}{r} \\ \times 82.1 \end{array}$

18. $99.1 \begin{array}{r} \\ \times 11.2 \end{array}$

19. **STEM** A single year on Saturn is equal to 29.4 years on Earth. About how many Earth-years are equal to 3.2 years on Saturn?

20. Fahd received a AED 50 gift card to a bookstore. He would like to buy 3 books that cost AED 15.75 each including tax. He estimates that he cannot buy all three books because each book costs about AED 20, and all three books would cost AED 60. Is his estimate reasonable? Explain your reasoning.

Use estimation to determine whether each answer is reasonable.

If the answer is reasonable, write yes. If not, write no and provide a reasonable estimate.

21. $22.8 \times 4.7 = 107.16$ _____

22. $2.1 \times 4.9 \times 7.2 = 105.84$ _____

23. $7.8 \times 1.1 \times 4.2 = 50$ _____

24. $43.8 \times 2.8 \times 3.1 = 371.8$ _____

25. **MP Use Math Tools** The table shows some nutritional facts about orange juice. Estimate each value for 1 liter of orange juice.
(Hint: 4 cups is equal to 1 liter.)

Orange Juice (1 cup)	
Calories	112
Vitamin C	96.9 mg
Carbohydrates	26.8 g
Calcium	22.4 mg



Power Up! Test Practice

26. A Dubai school lunch menu is shown. Estimate the cost for the following lunch combinations.

Combination	Total Cost
2 slices of pizza, salad, fruit punch	
fish and fries, pudding, milk	
1 slice of pizza, salad, pudding, fruit punch	

Thursday	
Pizza	AED 17.50
Fish & Fries	AED 22.50
Salad	AED 11.50
Fruit Punch	AED 7.50
Milk	AED 8.00
Pudding	AED 8.50

Which combination is the least expensive?

27. Mohamad and Khalid's hourly charge for mowing lawns is shown.

Mohamad	Khalid
AED 8.25/h	AED 5.60/h

Mohamad and Khalid each worked 25 hours. About how much more money did Mohamad earn?

Spiral Review

Multiply.

28.
$$\begin{array}{r} 65 \\ \times 18 \\ \hline \end{array}$$

29.
$$\begin{array}{r} 15 \\ \times 23 \\ \hline \end{array}$$

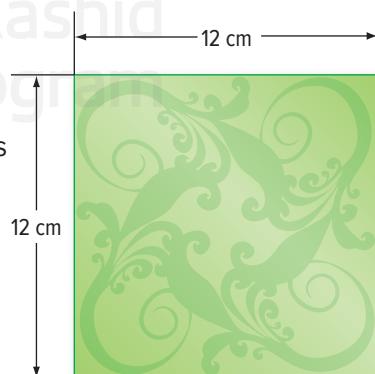
30.
$$\begin{array}{r} 198 \\ \times 75 \\ \hline \end{array}$$

31. Mariam spent AED 15.63 at the bookstore. She paid with a AED 20 bill.

How much change will she receive?

32. Salem is placing photos onto scrapbook paper for his photo album. The scrapbook paper is 12 centimeters long and 12 centimeters wide. What is the area of the paper?

(Hint: area = length \times width)



Multiply Decimals by Whole Numbers



Real-World Link

Plants Bamboo is one of the fastest growing plants. It can grow about 4.9 feet in height per day. It is a favorite food of panda bears. You can use repeated addition to find the total height a bamboo plant can grow over a number of days. Complete the table below. The first one is done for you.

Number of Days	Repeated Addition	Multiplication
2	$4.9 + 4.9 = 9.8$	$2 \times 4.9 = 9.8$
1.	$+ + =$	$\times 4.9 =$
2.	$+ + + =$	$\times 4.9 =$
3.	$+ + + + =$	$\times 4.9 =$

4. Use the pattern in the table to predict 6×4.9 .

Check by using repeated addition. _____

5. **MP Make a Conjecture** Look back at Exercises 1–4. Compare the number of decimal places in each factor to the number of decimal places in the product. How do you determine the placement of the decimal point in a product?



Which **MP Mathematical Practices** did you use?

Shade the circle(s) that applies.

- ① Persevere with Problems
- ② Reason Abstractly
- ③ Construct an Argument
- ④ Model with Mathematics
- ⑤ Use Math Tools
- ⑥ Attend to Precision
- ⑦ Make Use of Structure
- ⑧ Use Repeated Reasoning

Multiply Decimals

Using repeated addition can help you place the decimal point. The whole number represents the number of times the decimal is used as an addend. So, place the decimal point in the product the same number of places from the right as the decimal factor.

Examples

1. Find 4×0.83 .

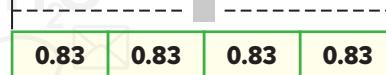
Estimate $4 \times 1 = 4$

$$\begin{array}{r} 0.83 \\ \times 4 \\ \hline 3.32 \end{array}$$

← two decimal places

Place the decimal point two places from the right.

Check for Reasonableness $3.32 \approx 4$ ✓



4 groups of 0.83

2. Find 3×14.2 .

Estimate $3 \times 14 = 42$

$$\begin{array}{r} 14.2 \\ \times 3 \\ \hline 42.6 \end{array}$$

← one decimal place

Place the decimal point one place from the right.



3 groups of 14.2

3. Find 4×0.95 .

Estimate $4 \times \square = \square$

Use the bar diagram to find the product.



0.95 groups of \square

$$\begin{array}{r} 0 . 9 5 \\ \times 4 \\ \hline \square \ \square \ \square \end{array}$$

0.95 has \square decimal places.

Place the decimal point \square places from the right.

Check for Reasonableness $\square \approx \square$ ✓

a. _____

b. _____

c. _____

Got it? Do these problems to find out.

a. 5×0.25

b. 8×4.47

c. 9×2.63

Annex Zeros in the Product

If there are not enough decimal places in the product, you need to annex zeros to the left. To annex a zero means to place a zero at the beginning or end of a decimal.

Examples

4. Find 2×0.018 .

$$\begin{array}{r}
 0.018 \\
 \times 2 \\
 \hline
 0.036
 \end{array}$$

three decimal places

Annex a zero on the left of 36 to make three decimal places.

Check by Adding

$$\begin{array}{r}
 0 . 0 1 8 \\
 + 0 . 0 1 8 \\
 \hline
 \end{array}$$

Annex a zero on the left of 36 to make three decimal places.

5. Find 4×0.012 .

$$\begin{array}{r}
 0 . 0 1 2 \\
 \times 4 \\
 \hline
 \end{array}$$

0.012 has decimal places.

Annex a to make decimal places.

Check by Adding

$$\begin{array}{r}
 0 . 0 1 2 \\
 0 . 0 1 2 \\
 0 . 0 1 2 \\
 + 0 . 0 1 2 \\
 \hline
 \end{array}$$

Annex a zero on the left of 36 to make three decimal places.

Got it? Do these problems to find out.

d. 3×0.02

e. 0.12×8

f. 11×0.045

Show your work.

d. _____

e. _____

f. _____



Example

6. A batch of trail mix calls for 1.2 kilograms of dry cereal. Najla is making 5 batches of trail mix. She already has 2.2 kilograms of cereal. How many more kilograms of dry cereal does she need?

Step 1 Multiply.

$$\begin{array}{r} 1.2 \\ \times 5 \\ \hline 6.0 \end{array}$$

one decimal place

Step 2 Subtract.

$$\begin{array}{r} 6.0 \\ - 2.2 \\ \hline 3.8 \end{array}$$

So, Najla will need 3.8 more kilograms of dry cereal.



Guided Practice

Multiply. (Examples 1–5)

1. $2.7 \times 6 =$ _____

2. $0.52 \times 3 =$ _____

3. $5 \times 0.09 =$ _____



4. $4 \times 0.027 =$ _____

5. $0.071 \times 8 =$ _____

6. $0.065 \times 18 =$ _____

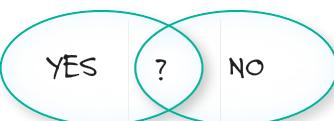
7. A bee hummingbird has a mass of 1.8 grams. How many grams are 6 hummingbirds and a 4-gram nest? (Example 6)

8. Jasim buys 12 pencils for AED 0.86 each. He pays with a AED 10 bill. How much change will he receive? (Example 6)

9. **Building on the Essential Question** How can estimating products help you to place the decimal correctly? _____

Rate Yourself!

Are you ready to move on?
Shade the section that applies.



Independent Practice

Multiply. (Examples 1–5)

1. $1.2 \times 7 =$ _____



2. $0.7 \times 9 =$ _____

3. $2 \times 1.3 =$ _____

4. $0.8 \times 9 =$ _____

5. $3 \times 0.02 =$ _____

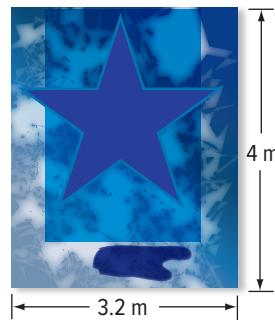
6. $0.0036 \times 19 =$ _____

7. Amina buys 14 folders for AED 0.75 each. How much change

will she receive if she pays with AED 15? (Example 6) _____

8. **STEM** The hottest temperature recorded in the world, in degrees Fahrenheit, can be found by multiplying 13.46 by 10. Find this temperature.

Justify your procedure. _____

9. **MP Justify Conclusions** Fahd recently bought the poster shown at the right. What is its area? Explain your reasoning to a classmate.(Hint: Use area = length \times width.) _____

10. **MP Use Math Tools** The thickness of each type of coin is shown in the table. How much thicker is a stack of a dirham's worth of 5-fils coins than a dirham's worth of 25-fils coins? Explain your answer.

Coin	Thickness (mm)
1-fils coin	1.55
5-fils coins	1.95
10-fils coin	1.35
25-fils coins	1.75



H.O.T. Problems Higher Order Thinking

11. **MP Model with Mathematics** Write a real-world problem involving multiplication by a decimal factor. Then solve the problem.

12. **MP Persevere with Problems** Discuss two different ways to find the value of the expression $5.4 \times 1.17 \times 100$ that do not require you to first multiply 5.4×1.17 .

13. **MP Reason Inductively** Use the product of 123×47 to find the product of 123×0.47 . Explain the difference in the two products.

14. **MP Construct an Argument** Your friend thinks that $1.5 \times 8 = 1.20$ because you do not count the zero when placing the decimal point. Is your friend correct? Justify your reasoning.

15. **MP Construct an Argument** Explain how you can mentally determine whether 125×0.9 is less than, greater than, or equal to 125.

Extra Practice

Multiply.

16. $1.7 \times 5 =$ 8.5

Homework Help 

$$\begin{array}{r}
 3 \\
 1.7 \\
 \times \quad 5 \\
 \hline
 8.5
 \end{array}$$

17. $0.9 \times 4 =$ _____

18. $2.4 \times 8 =$ _____

19. $3 \times 0.5 =$ _____

20. $7 \times 0.012 =$ _____

21. $0.0198 \times 75 =$ _____

22. The mass of a certain monarch butterfly is 0.56 gram. What is the mass of 4 monarch butterflies?



23. The height of Mount Everest, in meters, can be found by multiplying 8.85 by 1,000. Find the height of Mount Everest. Explain your answer.

24. A sheet of printer paper is 8.5 inches by 11 inches. What is the area of the paper? (Hint: area = length \times width)

25. Sofia bought 12 pens for AED 0.59 each. She paid with a AED 10 bill. How much change will she receive?

26. **MP Be Precise** One kilometer is about 0.62 mile. It is 12 kilometers from Ali's house to the ice skating rink. About how many miles is it from Ali's house to the ice skating rink?

Power Up! Test Practice

27. The school store is selling the items shown in the table. Ahmad has AED 12.

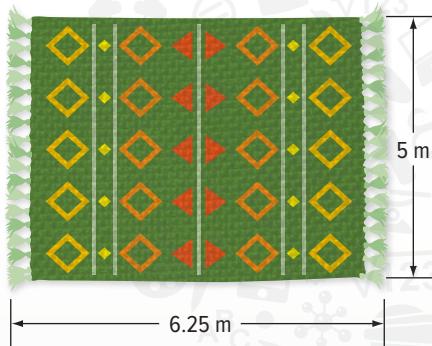
Which of the following can he buy? Select all that apply.

- two pennants, two bumper stickers, and four magnets
- three pennants and two bumper stickers
- two pennants, three bumper stickers, and one magnet
- four pennants, a bumper sticker, and one magnet

Item	Price (AED)
Pennant	2.49
Bumper Sticker	1.79
Magnet	0.89

28. Mrs. Jamila designed the rug shown. If it costs AED 22 per square meter

to make, how much will Mrs. Jamila pay for the rug?



Spiral Review

29. Use number patterns and powers of ten to complete the table.

Factor	\times	Factor	=	Product
2.9	\times	10	=	
3.44	\times		=	344
	\times	100	=	870
10.25	\times		=	102.5
156.23	\times	10	=	

Round each decimal to the nearest whole number.

30. $5.7 \approx$ _____

31. $0.05 \approx$ _____

32. $13.49 \approx$ _____

33. Several students from Al Najah Middle School are visiting the

Dubai Museum. Mrs. Alia divided the students into 5 equal groups. There are 3 boys and 4 girls in each group. Fill in the missing numbers to find the total number of students.

$$\square \times (\square + 4) = \square \text{ students}$$

Multiply Decimals by Decimals



Real-World Link

Planets The table shows the weight of a 1-pound object on each planet.

Planet	Weight (Pounds)
Mercury	0.3
Venus	0.9
Earth	1
Mars	0.3
Jupiter	2.3
Saturn	1
Uranus	0.8
Neptune	1.1



Essential Question

HOW can estimating be helpful?

MP Mathematical Practices

1, 2, 3, 4, 5, 6



1. A 0.5-pound object weighs one half as much as a 1-pound object. If a cheeseburger weighs a half pound on Earth, what will it weigh on Jupiter? _____
2. What would a barbell that weighs 5 pounds on Earth weigh on Jupiter? _____
3. Use the results from Exercises 1 and 2 to find 0.05×2.3 . Explain your answer. _____

Which **MP Mathematical Practices** did you use?
Shade the circle(s) that applies.

- ① Persevere with Problems
- ⑤ Use Math Tools
- ② Reason Abstractly
- ⑥ Attend to Precision
- ③ Construct an Argument
- ⑦ Make Use of Structure
- ④ Model with Mathematics
- ⑧ Use Repeated Reasoning

Multiply Decimals

When multiplying a decimal by a decimal, multiply as with whole numbers. To place the decimal point, find the sum of the number of decimal places in each factor. The product has the same number of decimal places.

STOP and Reflect

How is the product of 4.2×6.7 similar to the product of 42×67 ? How are they different? Explain below.

Examples

1. Find 3.6×0.05 .

Estimate $3.6 \times 0.05 \rightarrow 4 \times 0$ or 0

$$\begin{array}{r}
 3.6 \quad \leftarrow \text{one decimal place} \\
 \times 0.05 \quad \leftarrow \text{two decimal places} \\
 \hline
 0.180 \quad \leftarrow \text{three decimal places}
 \end{array}$$

The product is 0.180 or 0.18.

Once you place the decimal point, you can drop the zero at the right.

2. Find 0.112×7.2 .

Estimate $0.112 \times 7.2 \approx \square \times \square$ or \square

0.112 has \square decimal places.

7.2 has \square decimal place.

So the product has $\square + \square$, or \square decimal places.

$$\begin{array}{r}
 0. \quad 1 \quad 1 \quad 2 \\
 \times \quad \quad \quad \quad \\
 \hline
 7. \quad 2 \\
 + \quad \quad \quad \quad \\
 \hline
 \end{array}$$

The product is $\underline{\hspace{2cm}}$.

Check for reasonableness $\underline{\hspace{2cm}} \approx \underline{\hspace{2cm}}$ ✓

a. $\underline{\hspace{2cm}}$

b. $\underline{\hspace{2cm}}$

c. $\underline{\hspace{2cm}}$

Got it? Do these problems to find out.

a. 5.7×2.8

b. 4.12×0.05

c. 0.014×3.7

Annex a Zero

If there are not enough decimal places in the product, you need to annex zeros to the left.

Examples

3. Find 1.4×0.067 .

$$\begin{array}{r}
 0.067 \\
 \times 1.4 \\
 \hline
 268 \\
 + 67 \\
 \hline
 0.0938
 \end{array}$$

← three decimal places
 ← one decimal place
 Annex a zero to make four decimal places.

4. Find 0.45×0.053 .

The product will have decimal places. Annex zeros, if needed.

$$\begin{array}{r}
 & 0. & 4 & 5 \\
 \times & 0. & 0 & 5 & 3 \\
 \hline
 & \square & \square & \square & \square \\
 + & \square & \square & \square & \square \\
 \hline
 & \square & \square & \square & \square & \square
 \end{array}$$

Check Multiply related whole numbers.

$$\begin{array}{r}
 4 \quad 5 \\
 \times \quad 5 \quad 3 \\
 \hline
 \square \quad \square \quad \square \quad \square \\
 + \quad \square \quad \square \quad \square \\
 \hline
 \square \quad \square \quad \square \quad \square
 \end{array}$$

Move the decimal to the left 5 places. What is the number?

Is the answer the same?

Show your work. 

d.

e.

f.

Got it? Do these problems to find out.

d. 0.04×0.32

e. 0.26×0.205

f. 1.33×0.06



Example



5. A certain car can travel 28.45 miles with one gallon of petrol. The petrol tank can hold 11.5 gallons. How many miles can this car travel on a full tank of petrol? Justify your answer.

Estimate $28.45 \times 11.5 \rightarrow 30 \times 12$ or 360

$$\begin{array}{r}
 28.45 \\
 \times 11.5 \\
 \hline
 14225 \\
 2845 \\
 + 2845 \\
 \hline
 327.175
 \end{array}$$

← two decimal places
← one decimal place

← The product has three decimal places.

The car could travel 327.175 miles. Since 327.175 is close to 360, the answer is reasonable.

Guided Practice



Multiply. (Examples 1–4)

Show your work.

1. $0.6 \times 0.5 =$ _____

2. $27.43 \times 1.089 =$ _____

3. $0.98 \times 7.3 =$ _____

4. $2.7 \times 1.35 =$ _____

5. $0.03 \times 0.09 =$ _____

6. $0.04 \times 2.12 =$ _____

7. A mile is equal to approximately 1.609 kilometers.

How many kilometers is 2.5 miles? Justify your

answer. (Example 5) _____

8. **Building on the Essential Question** Why is estimating not as helpful when multiplying very small numbers such as 0.007 and 0.053? _____

Rate Yourself!

Are you ready to move on?
Shade the section that applies.



Independent Practice

Multiply. (Examples 1–4)

1. $0.7 \times 0.4 =$ _____



2. $0.4 \times 3.7 =$ _____

3. $0.52 \times 2.1 =$ _____

4. $6.2 \times 0.03 =$ _____

5. $14.7 \times 11.361 =$ _____

6. $0.28 \times 0.08 =$ _____

7. **STEM** A giraffe can run up to 16.6 meters per second. How far could a giraffe run in 1.8 seconds? Justify your answer.

(Example 5)

8. A nutrition label indicates that one serving of apple crisp oatmeal has 2.5 grams of fat. How many grams of fat are there in 3.75 servings? Justify your answer. (Example 5)

9. **Financial Literacy** Pears cost AED 0.92 per kilogram and apples cost AED 1.10 per kilogram. Mr. Mustafa bought 3.75 kilograms of pears and 2.1 kilograms of apples. How much did he pay for the pears and apples? Explain your answer.

Multiply.

10. $25.04 \times 3.005 =$ _____

11. $1.03 \times 1.005 =$ _____

12. $5.12 \times 4.001 =$ _____

13. **STEM** The table shows the approximate distance around Earth.

Location	Approximate Distance (mi)
around Earth at the equator	24,889.78
around Earth through the poles	24,805.94

a. About how many more miles would a satellite travel if it circled the equator 2.5 times than if it circled around the poles 2.5 times?

b. The distance around Jupiter at the equator is about 17.6 times greater than the distance around Earth at the equator. About how many more miles would a satellite travel if it circled Jupiter's equator than if it circled Earth's equator? Round to the nearest tenth.



H.O.T. Problems Higher Order Thinking

14. **MP Reason Abstractly** Write a multiplication problem in which the product is between 0.05 and 0.75.

15. **MP Justify Conclusions** Place the decimal point in the answer to make it correct. Explain your reasoning. $3.9853 \times 8.032856 = 32013341\ldots$

16. **MP Construct an Argument** Determine whether the following statement is *always*, *sometimes*, or *never* true. Give examples to justify your answer.

The product of two decimals less than 1 is less than either of the factors.

17. **MP Reason Inductively** Is the product of 0.4×1.8 greater than or less than 0.4? Explain your reasoning.

18. **MP Persevere with Problems** Evaluate the expression $0.3(3 - 0.5)$.

19. **MP Model with Mathematics** Write a word problem in which you multiply two decimals. The product should be between 0 and 1.

Extra Practice

Multiply.

20. $1.5 \times 2.7 =$ 4.05

1.5
 $\times \quad 2.7$
105
 $+30$
4.05

Homework Help

23. $5.04 \times 3.2 =$ _____

21. $3.1 \times 0.8 =$ _____

22. $2.4 \times 3.48 =$ _____

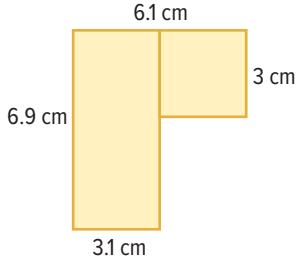
24. $27.4 \times 33.68 =$ _____

25. $0.451 \times 0.05 =$ _____

26. Eman has a vegetable garden that measures 16.75 meters in length and 5.8 meters in width. Find the area of the garden. Justify your answer.

27. **MP Use Math Tools** Find examples of decimals in a newspaper or magazine, on television, or on the Internet. Write a real-world problem in which multiplies decimals.

28. **MP Be Precise** Find the area of the figure at the right. Justify your procedure.



29. Mohamad walked for 2.5 hours at a speed of 3.2 kilometers per hour. Khalid walked for 1.8 hours at a speed of 4.1 kilometers per hour. (Hint: Distance equals speed times time.)

a. Who walked farther? _____

b. How much farther did that person walk? _____



Power Up! Test Practice

30. Khaled can rollerblade 9.7 kilometers per hour. Omar can rollerblade 8.2 kilometers per hour. How much farther will Khaled rollerblade in 0.75 hour?

31. Look at the figures below. The area of the larger rectangle is 4 times the area of the smaller rectangle. Fill in the missing measurement.



cm

Spiral Review

Divide.

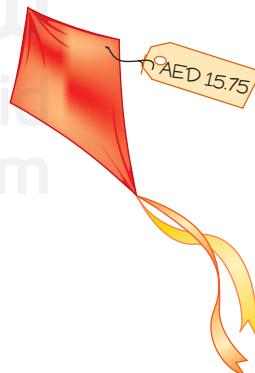
32. $60 \div 12 =$ _____

33. $96 \div 8 =$ _____

34. $750 \div 15 =$ _____

35. Saif has 20 action figures. He is shipping them to a friend. He can fit 3 action figures in a box. How many boxes will he need?

36. Three friends are dividing the cost of a kite equally. The kite costs AED 15.75. How much will each person pay?



Inquiry Lab 1

Multiply by Powers of Ten



HOW can number patterns be used to multiply by powers of 10?

MP Mathematical Practices
1, 3, 5

Each planet in our solar system orbits around the Sun at a different distance from the Sun. Mercury orbits at an average distance of 28.6 million miles. One million is 1,000,000. What is $28.6 \times 1,000,000$?

What do you know? _____

What do you need to know? _____

Hands-On Activity

Numbers like 10, 100, and 1,000 are called *powers of 10* because they can be obtained by raising 10 to a power.

Step 1 Use the table to find a pattern.

Decimal	\times	Power of 10	=	Product
28.6	\times	0.1	=	2.86
28.6	\times	1	=	28.6
28.6	\times	10	=	286
28.6	\times	1,000	=	28,600



Move the decimal point the _____ number of places as the number of zeros in the power of 10.

Move the decimal point to the _____ when multiplying by a power of 10 that is less than 1.

Move the decimal point to the _____ when multiplying by a power of 10 that is greater than 1.

Step 2

Determine how many zeros are in 1,000,000 and move the decimal point in 28.6 the appropriate number of places.

There are zeros in 1,000,000.

$$\begin{aligned}
 28.6 \text{ million} &= 28.6 \times 1,000,000 \\
 &= 28,600,000 \\
 &= 28,600,000
 \end{aligned}$$

Move the decimal point places to the right.



Investigate

MP Use Math Tools Work with a partner to complete the tables.

	Decimal	Power of 10	=	Product
1.	12.4	\times 0.1	=	1.24
2.	12.4	\times 0.01	=	
3.	12.4	\times 0.001	=	
	12.4	\times 0.0001	=	



	Decimal	Power of 10	=	Product
4.	1.24	\times 1	=	1.24
5.	1.24	\times 10	=	
6.	1.24	\times 100	=	
7.	1.24	\times 1,000	=	
8.	1.24	\times 10,000	=	
9.	1.24	\times 100,000	=	
10.	1.24	\times 1,000,000	=	
	1.24	\times 10,000,000	=	

11. **MP Use Math Tools** Suppose you plan to purchase 10 items that each cost AED 4.95. Explain how to use mental math to find the cost of the 10 items.

12. **MP Reason Inductively** The product of 13.6 and a power of 10 is 13,600. What is the power of 10? Explain.



Create

13. **MP Reason Abstractly** Write a rule you can use to find the product of a number and power of 10 without using paper and pencil or a calculator.

14. **Inquiry** HOW can number patterns be used to multiply by powers of 10?

MP Problem-Solving Investigation

Look for a Pattern

Case #1 Spring Gathering

The Student Council is organizing a spring gathering. They plan to decorate with helium-filled balloons. The cost of the balloons is shown in the table.

What is the cost of 6 bags of balloons?

MP Mathematical Practices
1, 3, 4, 8

Number of Bags	Total Cost (AED)
1	4.75
2	9.50
3	14.25
4	19.00

1
2
3

Understand *What are the facts?*

The table shows the cost of the balloons. Six bags of balloons are needed.

Plan *What is your strategy to solve this problem?*

Look for a pattern in the table. Each bag costs AED 4.75.

Solve *How can you apply the strategy?*

Complete the table to find the cost of 6 bags of balloons.

Number of Bags	Total Cost (AED)
1	4.75
2	9.50
3	14.25
4	19.00
5	
6	

+ 4.75
+ 4.75
+ 4.75
+ 4.75
+ 4.75
+ 4.75



So, six bags of balloons cost AED _____.

4

Check *Does the answer make sense?*

Use multiplication to check your answer. AED $4.75 \times 6 =$ _____ ✓

Analyze the Strategy

MP **Reason Inductively** How would the results change if the store offered a discount of AED 0.50 for each bag of balloons? _____

Case #2 Virtual DJ

The Student Council is renting equipment for the spring gathering. They expect the gathering to last for 5 hours. The cost to rent the equipment is shown in the table.

How much will it cost to rent equipment for the gathering?



1

Understand

Read the problem. What are you being asked to find?

I need to _____.

Underline key words and values in the problem.

What information do you know?

The cost to rent is AED _____ for 1 hour, AED _____ for

2 hours, and AED _____ for 3 hours.

Cost to Rent Equipment	
Number of Hours	Total Cost (AED)
1	125.50
2	251.00
3	376.50

Is there any information that you do not need to know?

I do not need to know _____.

2

Plan

Choose a problem-solving strategy.

I will use the _____ strategy.

3

Solve

Use your problem-solving strategy to solve the problem.

Describe the pattern. Then complete the table.

The cost to rent equipment _____ by AED _____ for each hour.

Cost to Rent Equipment				
Number of Hours	1	2	3	4
Total Cost (AED)	125.50	251.00	376.50	



So, it will cost AED _____ to cost to rent equipment for 5 hours.

4

Check

Use information from the problem to check your answer.

AED _____ \times _____ = AED _____



Work with a small group to solve the following cases.
Show your work on a separate piece of paper.

Case #3 Gaming

The table shows the cost of a subscription to the Action Gamers Channel.

Action Gamers Channel Prices	
Number of Months	Total Cost (AED)
2	15.90
3	23.85
4	31.80

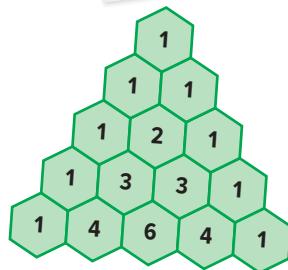
What is the cost of a 1 year subscription?



Case #4 Number Theory

The diagram to the right is known as Pascal's Triangle.

If the pattern continues, what will the numbers in the next row be from left to right?



Case #5 Number Sense

Describe the pattern below. Then find the next three numbers.

3.5, 13, 41.5, 127, , ,

Use any strategy!

Case #6 Games

Omar wants to buy a new game system. A certain store sells the system for AED 235.99 and the games for AED 45.99 each. He bought one system and 3 games.

If Omar used a AED 400 gift card, how much will be left on the card?

Mid-Chapter Check

Vocabulary Check



1. Define *product*. Give an example of two whole number factors with a product of 9.

Skills Check and Problem Solving

Find each sum or difference. (Lesson 1)

2. $42.7 + 52.12 =$ _____

3. $4.7 - 3.28 =$ _____

4. $8.37 - 0.015 =$ _____

Multiply. (Lessons 3 and 4)

5. $2.3 \times 5 =$ _____

6. $3.4 \times 5.2 =$ _____

7. $1.2 \times 0.015 =$ _____

8. The table shows a list of walking trails in the UAE. Shaikha walked the Noura Trail 6 days last week. How many kilometers did she walk in a week. (Lesson 3)

Location	Length of Trail (km)
Hamad Trail	4.8
Hamed Trail	3.3
Huda Trail	4.3
Noura Trail	5.7
Fadi Trail	5.0

9. **MP Be Precise** The length of a pool table is 7.1 feet and the width is 3.6 feet. Find the area of the surface of the pool table by multiplying the length by the width. (Lesson 4)

10. **MP Persevere with Problems** While shopping for school supplies, Ali buys two 3-ring binders, three packages of pencils, and two erasers. If he pays using a AED 20 bill, how much change will he receive? (Lesson 2) _____

School Supplies	
Item	Cost (AED)
eraser	0.75
package of pencils	1.50
3-ring binder	2.75

Divide Multi-Digit Numbers

Vocabulary Start-Up



When one number is divided by another, the result is called a *quotient*. The *dividend* is the number that is divided and the *divisor* is the number used to divide another number.

Label the division problem with the correct vocabulary term: quotient, dividend, and divisor.



Real-World Link

Circulation When you are at rest it takes about 60 seconds for a single blood cell to travel around your body and back to your heart.

1. In 120 seconds, about how many times does a single blood cell travel around your body and back to your heart? Write the dividend, divisor, and quotient in the diagram below.



2. Jamila's target heart rate should be about 200 beats per minute. Estimate the number of times Jamila's heart will beat in one second if her heart is working at this rate. Explain.

Which **MP** **Mathematical Practices** did you use?
Shade the circle(s) that applies.

- ① Persevere with Problems
- ② Reason Abstractly
- ③ Construct an Argument
- ④ Model with Mathematics
- ⑤ Use Math Tools
- ⑥ Attend to Precision
- ⑦ Make Use of Structure
- ⑧ Use Repeated Reasoning



Divide Three-Digit Dividends

In this lesson, you will divide multi-digit numbers. Use estimation to help you place the first digit in the quotient.

Examples

1. Find $351 \div 9$.

Estimate $360 \div 9 = 40$. So, the first digit is in the tens place.

Write $351 \div 9$ as $9 \overline{)351}$.

$$\begin{array}{r} 39 \\ 9 \overline{)351} \\ -27 \\ \hline 81 \\ -81 \\ \hline 0 \end{array}$$

Divide each place-value position from left to right.

Since $81 - 81 = 0$, there is no remainder.

So, $351 \div 9$ is 39.

Check Compare 39 to the estimate. $39 \approx 40$ ✓

2. Find $31 \overline{)878}$.

Estimate $900 \div 30 = 30$. So, the first digit is in the tens place.

$$\begin{array}{r} 28 \text{ R10} \\ 31 \overline{)878} \\ -62 \\ \hline 258 \\ -248 \\ \hline 10 \end{array}$$

Divide each place-value position from left to right.

Since $258 - 248 = 10$ and $10 < 31$, 10 is the remainder.

So, $31 \overline{)878}$ is 28 R10.

Check $28 \text{ R10} \approx 30$ ✓

Got it? Do these problems to find out.

Find each quotient.

a. _____

b. _____

a. $768 \div 8$

b. $16 \overline{)318}$



Divide Four-Digit Dividends

The steps for dividing three-digit dividends and four-digit dividends are the same.

Examples

3. Find $6,493 \div 75$.

Estimate $6,400 \div 80 = 80$

$$\begin{array}{r} 86 \text{ R}43 \\ 75 \overline{)6,493} \\ -600 \\ \hline 493 \\ -450 \\ \hline 43 \end{array}$$

Divide each place-value position from left to right.

Check for Reasonableness $86 \text{ R}43 \approx 80$ ✓

The quotient of $6,493 \div 75$ is 86 R43.

4. The average person has 1,460 dreams a year. What is the average number of dreams a person has each night?

Find $1,460 \div 365$.

Estimate $1,600 \div 400 = 4$

$$\begin{array}{r} 4 \\ 365 \overline{)1,460} \\ -1,460 \\ \hline 0 \end{array}$$

Check for Reasonableness $4 = 4$ ✓

The average number of dreams a person has each night is 4.

Got it? Do these problems to find out.

c. Find $56 \overline{)4,321}$.

d. Find $91 \overline{)8,465}$.

e. To promote its opening weekend, a water park gave the local middle school 1,050 free tickets. The middle school has 350 students. Each student will receive the same number of tickets. How many tickets will each student receive?

Check Your Answer

You can check division with a remainder. Multiply the quotient by the divisor. Then add the remainder.

$$\begin{array}{r} 86 & 6,450 \\ \times 75 & + 43 \\ \hline 6,450 & 6,493 \end{array}$$

Show your work.

c. _____

d. _____

e. _____



Example



5. The total number of seats in a college stadium is 54,912. There are 44 sections and each section has an equal number of seats. How many seats are in each section?

Divide 54,912 by 44.

$$\begin{array}{r} 1,248 \\ 44 \overline{)54,912} \\ -44 \\ \hline 109 \\ -88 \\ \hline 211 \\ -176 \\ \hline 352 \\ -352 \\ \hline 0 \end{array}$$

Divide each place-value position from left to right.

There are 1,248 seats in each section.

Guided Practice



Find each quotient. (Examples 1–4)

1. $8 \overline{)736}$

Show your work.

2. $11 \overline{)620}$

3. $19 \overline{)7,814}$

4. $37 \overline{)3,511}$

5. Tareq bought two new jet skis for AED 15,480. He will make 36 equal payments. How much will each payment be?

(Example 5) _____

6.  **Building on the Essential Question** How is estimation helpful when dividing multi-digit numbers?

Rate Yourself!

How well do you understand dividing multi-digit numbers? Circle the image that applies.



Clear



Somewhat Clear



Not So Clear

Independent Practice

Find each quotient. (Examples 1–3)

1. $174 \div 6 =$



2. $453 \div 8 =$

3. $645 \div 43 =$

4. $299 \div 21 =$

5. $62 \overline{)8,090}$

6. $31 \overline{)2,480}$

7. $34 \overline{)5,780}$

8. $16 \overline{)3,482}$

9. A tour bus travels 2,160 kilometers in 36 hours. What is the average distance the bus travels in one hour? (Example 4)



10. A charity sold 475 tickets to a dinner auction. If the charity raised AED 16,625 in ticket sales, what was the cost of one ticket? (Example 5)

11. A city phone book has 86 pages filled with residents' names. There are a total of 15,050 names in the book. Each page has an equal number of names on it. How many names are on each page? (Example 5)

12. **MP Use Math Tools** The table shows the number of servings for different size cakes at Reem's Bakery. Suppose a high school graduation expected 2,889 guests. How many X-large sheet cakes should the school order? Explain how you solved.

Reem's Bakery	
Sheet Cake Size	Number of Servings
Small	30
Medium	60
Large	90
X-Large	120

13. **MP Be Precise** How many 8-ounce cups can be filled from 9 gallons of juice?
(Hint: There are 128 ounces in one gallon.)

Show your work. 

14. **MP Be Precise** Water stations will be placed every 600 meters of a fifteen kilometer race. How many water stations will be needed?
(Hint: There are 1,000 meters in one kilometer.)

H.O.T. Problems Higher Order Thinking

15. **MP Model with Mathematics** Write and solve a real-word problem that involves a two-digit divisor and a four-digit dividend.

16. **MP Persevere with Problems** If the divisor is 40, what is the least three-digit dividend that would give a remainder of 4?

17. **MP Justify Conclusions** Can the remainder in a division problem ever equal the divisor? Why or why not?

18. **MP Reason Abstractly** Use the digits 2, 4, and 8 one time each in the following problem.

$$\square, \square 00 \div \square 0 = 30$$

19. **MP Reason Inductively** The table shows the mileage Hind drove on her trip. She drove for a total of 24 hours. Explain how to find her average speed. Then find the average speed.

Hind's Trip	
Day	Kilometers
1	486
2	316
3	638

Extra Practice

Find each quotient.

20. $182 \div 7 =$

26

Homework Help

$$\begin{array}{r} 26 \\ 7 \overline{)182} \\ -14 \\ \hline 42 \\ -42 \\ \hline 0 \end{array}$$

21. $345 \div 6 =$

22. $792 \div 33 =$

23. $811 \div 79 =$

24. $44 \overline{)2,876}$

25. $26 \overline{)4,340}$

26. $33 \overline{)9,537}$

27. $19 \overline{)4,257}$

28. A city library has 9,440 nonfiction books. The librarian wants to divide the books evenly among 80 shelves. How many books will be on each shelf?

Show your work.

29. A concession stand manager ordered 20,280 souvenir cups. He wants to divide the cups evenly among the 24 concession stands. How many cups will each concession stand receive?

30. **MP Use Math Tools** The table shows the average weight of animals. How many more tons does a blue whale weigh than an African elephant? Explain how you solved. (Hint: There are 2,000 pounds in one ton.)



Animal Weights	
Animal	Weight (pounds)
African Elephant	15,000
Blue Whale	238,000
Great White Shark	5,000
Lowland Gorilla	500

Power Up! Test Practice

31. A toy factory assembles 19,824 toy castles over a 12-hour period of time.
The same number of castles is assembled every hour.

How many toy castles were assembled each hour?

Each employee can assemble 28 castles per hour. How many employees worked each hour?

32. The table shows the total amount spent on each item in a Athlete team's order. There are 15 girls on the team. Complete the table to determine the individual cost of each item.

Item	Total Cost (AED)	Cost per Item
boots	960	
dress	1,350	
ribbons	105	
tights	180	
warm up	675	

How much will one team member spend on all of the items?

Spiral Review

Divide mentally.

33. $300 \div 5 =$

34. $4,800 \div 8 =$

35. $4,200 \div 6 =$

36. The maple tree in Ahmed's backyard is 58.6 feet tall. Plot 58.6 on the number line below. Then round 58.6 to the nearest whole number.



Estimate Quotients

Vocabulary Start-Up



To determine what a compatible number is, first you must determine what compatible means. Fill in the table below.

Definition:	Example:
What would make numbers compatible?	
	Non-Example:

compatible



Essential Question

How can estimating be helpful?



Vocabulary

compatible numbers

MP Mathematical Practices
1, 3, 4, 5



Real-World Link

Remote Control Khawla and her two sisters want to buy their little brother a remote control helicopter. The helicopter costs AED 28.90. They decided to split the cost equally.

1. What number that is a multiple of 3 is close to AED 28.90? Explain.

2. Use your answer from Exercise 1 to determine about how much each person will pay. Explain.

Which **MP** Mathematical Practices did you use?
Shade the circle(s) that applies.

- ① Persevere with Problems
- ② Reason Abstractly
- ③ Construct an Argument
- ④ Model with Mathematics
- ⑤ Use Math Tools
- ⑥ Attend to Precision
- ⑦ Make Use of Structure
- ⑧ Use Repeated Reasoning



Estimate by Rounding Dividends

To estimate quotients of decimals, use rounding and compatible numbers. **Compatible numbers** are numbers that are easy to divide mentally.

Examples

1. Estimate $11.75 \div 3$.

Round the dividend, 11.75, to a whole number.

The divisor is 3. So, round 11.75 to a whole number that is a multiple of 3.

$$\begin{array}{r} 4 \\ 3 \overline{)11.75} \end{array} \quad \rightarrow \quad 3 \overline{)12} \quad \text{Using multiples of 3, 12 is closest to 11.75}$$

So, $11.75 \div 3$ is about 4.

2. Khalfan's family bought five tickets to a charity auction. The receipt shows the total cost of the tickets. Estimate the cost of each ticket. Justify your answer.



$$\begin{array}{r} 12 \\ 5 \overline{)61.25} \end{array} \quad \rightarrow \quad 5 \overline{)60} \quad \text{Round 61.25 to 60.}$$

Each ticket costs about AED 12.

Since $5 \times 12 = 60$ and $60 \approx 61.25$, the answer is reasonable.

a. _____

Got it? Do these problems to find out.

b. _____

Estimate each quotient.

c. _____

a. $49.3 \div 7$ b. $25 \overline{)98.1}$

c. Suppose Khalfan's family decided to purchase 6 tickets for a total price of AED 64.50 using a discount. Estimate the cost of each ticket. Justify your answer.

Estimate by Rounding Divisors

You can also estimate quotients of decimals by rounding the divisors. Choose compatible numbers that are easy to divide mentally.

Examples

3. Estimate $32 \div 3.9$.

Round the divisor, 3.9, to a whole number.

The dividend is 32. So, round 3.9 to a whole number that is a factor of 32.

$$3.9 \overline{)32} \rightarrow 4 \overline{)32}$$

Round 3.9 to 4 since 32 and 4 are compatible numbers.

So, $32 \div 3.9$ is about 8.

Check by Multiplying $3.9 \times 8 = 31.2$

$$31.2 \approx 32 \checkmark$$

4. Estimate $56 \div 6.8$.

Round the divisor, , to a whole number.

The dividend is .

So, round 6.8 to a whole number that is a of 56.

Round 6.8 to .

$$6.8 \overline{)56} \rightarrow \boxed{} \overline{)56}$$

So, $56 \div 6.8$ is about .

Check by Multiplying $6.8 \times \boxed{} = \boxed{}$

$$\boxed{} \approx 56 \checkmark$$

Got it? Do these problems to find out.

Estimate each quotient.

d. $54 \div 9.16$

e. $10.75 \overline{)99}$

STOP and Reflect

How does the division fact $63 \div 9 = 7$ help you to estimate the quotient of $63 \div 8.4$? Answer below.

Show your work.

d. _____

e. _____



Example

5. **STEM** A Pacific Leatherback turtle can have a mass of up to 704.4 kilograms. An Olive Ridley turtle can have a mass of up to 49.9 kilograms. About how many times heavier is the Pacific Leatherback turtle? Explain why your answer is reasonable.

$$49.9 \overline{)704.4} \rightarrow 50 \overline{)700} \quad \begin{array}{l} 14 \\ \text{Round 49.9 to 50 and 704.4 to 700.} \end{array}$$

The Pacific Leatherback is about 14 times heavier than the Olive Ridley turtle.

Check for Reasonableness Since $50 \times 14 = 700$, and $700 \approx 704.4$, your answer is reasonable. ✓

Got it? Do this problem to find out.

f. _____

f. There are approximately 250.9 million cars in the United States. Spain has approximately 25.1 million cars. About how many times more cars does the U.S. have than Spain? Explain why your answer is reasonable.

Guided Practice



Estimate each quotient. (Examples 1, 3, and 4)

1. $25 \div 4.7 \approx$ _____

2. $40.79 \div 7 \approx$ _____

3. $38.1 \overline{)984.76} \approx$ _____



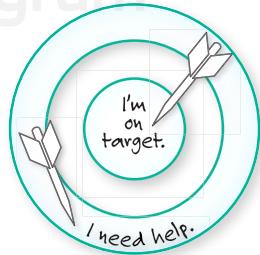
4. **STEM** The average yearly precipitation for Jeddah, SA, is 65.3 inches. About how much precipitation does the area receive each month? Explain why your answer is reasonable. (Example 2)

5. Mohamad bought 6.75 yards of fabric for a total of AED 47.50. About how much was the cost per yard? Explain why your answer is reasonable. (Example 5)

6. **e** **Building on the Essential Question** When is it helpful to estimate quotients? _____

Rate Yourself!

How confident are you about estimating quotients? Shade the ring on the target.



Independent Practice

Estimate each quotient. (Examples 1, 3, and 4)

1. $32.4 \div 3 \approx$ _____



2. $76.2 \div 18.4 \approx$ _____

3. $11.4 \overline{)35.7} \approx$ _____

4. **Financial Literacy** Fatima spent a total of AED 38.04 on four CDs. If each CD cost the same amount, what is a reasonable amount for the cost of each CD? Explain why your answer is reasonable. (Example 2)

5. A recipe for a smoothie calls for 0.75 kilograms of strawberries. If Hajar has 3.15 kilograms of strawberries, how many batches of the recipe can she make? (Example 5)

6. **Financial Literacy** For each handmade greeting card Salem sells, he makes a profit of AED 0.35. In one week, he made a profit of AED 42. He sells the cards for AED 0.75 each.

a. About how many greeting cards did Salem sell that week?



b. About how much did he earn before paying expenses?

7. **MP Justify Conclusions** The average cow produces about 53 pounds of milk per day. If one gallon of milk weighs about 8.5 pounds, estimate the number of gallons of milk a cow produces each day. Explain why your estimate is reasonable.

8. When full, a 22-gallon petrol tank holds 129.8 pounds of petrol. Estimate the weight of one gallon of petrol. If it costs AED 91.30 to fill the petrol tank, estimate the cost per gallon.

9. **MP Use Math Tools** Use estimation and mental math to find the four missing quantities from the receipt. _____

Precious Pets		Receipt	
Qty	Description	Unit Price	Total
1	Hamster cage	AED 35.99	AED 35.99
1	Exercise wheel	AED 5.29	AED 10.58
1	Softwood bedding	AED 6.29	AED 25.16
1	Hamster food	AED 4.59	AED 36.72
	Total	AED 108.45	



H.O.T. Problems Higher Order Thinking

10. **MP Model with Mathematics** Write a real-world division problem involving decimals in which you would use compatible numbers to estimate the quotient. _____

11. **MP Persevere with Problems** Determine where to place the decimal point in the dividend and divisor so that the quotient is between 23 and 25.

$$16023 \div 654$$

12. **MP Reason Inductively** Is an estimate for the quotient of a division problem involving decimals *always*, *sometimes*, or *never* less than the actual quotient of the numbers? Explain your reasoning. _____

13. **MP Justify Conclusions** Explain how you know which compatible numbers to use when estimating a decimal quotient. Support your answer with an example. _____

Extra Practice

Estimate each quotient.

14. $54 \div 9.4 \approx$ _____



$$9.4 \overline{)54} \rightarrow 9 \overline{)54}^6$$

15. $45.8 \div 23.6 \approx$ _____

16. $23.3 \overline{)119} \approx$ _____

17. The average annual snowfall in King Salmon, Alaska, is 45.9 inches. The snow season lasts about 7 months of the year. About how much snow does the area receive on average each month? Explain why your answer is reasonable.

18. Scientists at the zoo recently studied an anaconda that weighs 8,643.2 ounces. The average weight of the common rat is 11.8 ounces. About how many times heavier is the anaconda than the common rat? Explain why your answer is reasonable.

19. **(MP) Justify Conclusions** Hind would like to save AED 474.72 in a year to purchase a new video camera. She estimates she needs to save AED 40 per month. Explain why her estimate is reasonable.

20. A cash box containing only 25-fils coins has a mass of 850 grams when empty and 7,822 grams when filled. If a 25-fils coins weighs 5.6 grams, estimate the amount of money inside the cash box.

21. Jamila is making homemade stickers. She uses the recipe shown to create the glue for the stickers.

a. She has 545 milliliters of vinegar. Which is a more reasonable estimate for the number of batches she can make, 5 or 7? Explain your answer.

b. About how many times as many milliliters of vinegar are needed than lemon extract? _____



Power Up! Test Practice

22. For a craft activity at a day care, each child will need 1.75 yards of ribbon and 2.8 yards of fabric. There are 25 yards of ribbon and 30 yards of fabric available. Estimate the number of children that can participate in the activity. Explain your reasoning.

23. An advertisement showing the costs of different bikes was in the local newspaper.

The cost of a 26" bike is equal to about how many bike locks?

- about 7 locks
- about 8 locks
- about 9 locks
- about 10 locks

Bike Country	
26" Bike	AED 135.99
Folding Bike Rack	AED 43.95
Seat Covers	AED 6.59
Bike Lock	AED 12.89
Helmet	AED 29.49

Spiral Review

Find each quotient.

24. $8.4 \div 10 =$ _____

25. $100 \overline{)14.7} =$ _____

26. $94.5 \div 100 =$ _____

27. Describe the number pattern below. Then find the next three numbers.

7,345.6; 734.56; 73.456; _____; _____; _____

28. The movie theater sold 825 tickets to fill 3 theaters. Each theater has an equal number of seats. How many seats are in each theater?



Divide Decimals by Whole Numbers



Real-World Link

Movies Noura, Salma, Dana and Abeer went to the movies and ordered snacks from the menu shown.

1. How much did they pay for four small popcorns?
 $\underline{\quad} \times 4 = \underline{\quad}$

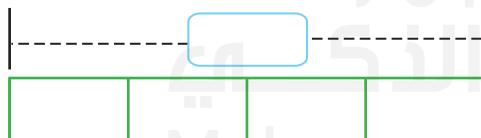
2. What is the total cost for two small packages and one large package of candy?
 $\underline{\quad}$

3. How much do four medium drinks cost?
 $\underline{\quad} \times 4 = \underline{\quad}$

4. What is the total cost for Exercises 1–3?

Popcorn	AED	<input type="text"/>	<input type="text"/>
Candy	AED	<input type="text"/>	<input type="text"/>
Drinks	+ AED	<input type="text"/>	<input type="text"/>
	AED	<input type="text"/>	<input type="text"/>

5. Estimate how much each person should pay if they split the total cost evenly.



Cinema 15		
Popcorn	small	AED 2.45
	large	AED 5.60
Candy	small	AED 2.25
	large	AED 3.20
Drink	small	AED 2.75
	medium	AED 3.35
	large	AED 3.95



Essential Question

How can estimating be helpful?

MP Mathematical Practices

1, 3, 4, 5, 6



Which **MP** Mathematical Practices did you use?

Shade the circle(s) that applies.

- ① Persevere with Problems
- ⑤ Use Math Tools
- ② Reason Abstractly
- ⑥ Attend to Precision
- ③ Construct an Argument
- ⑦ Make Use of Structure
- ④ Model with Mathematics
- ⑧ Use Repeated Reasoning

Divide a Decimal by a 1-Digit Number

When dividing a decimal by a whole number, divide as with whole numbers. Then place the decimal in the quotient directly above its place in the dividend.

Example

1. Find $6.8 \div 2$. **Estimate** $6 \div 2 = 3$

$$\begin{array}{r} 3.4 \\ 2)6.8 \\ -6 \\ \hline 08 \\ -8 \\ \hline 0 \end{array}$$

6 ones divided by 2 is 3 ones.

8 tenths divided by 2 is 4 tenths.

$$\begin{array}{r} \cdots\cdots 6.8 \cdots\cdots \\ \boxed{} \quad \boxed{} \end{array}$$

a. _____

b. _____

c. _____

$6.8 \div 2 = 3.4$ Compared to the estimate, the quotient is reasonable.

Got it? Do these problems to find out.

a. $7.5 \div 3$

b. $3.5 \div 7$

c. $9.8 \div 2$

Checking Answers

To check that the answer is correct, multiply the quotient by the divisor.

In Example 2,

$$0.55 \times 14 = 7.7. \checkmark$$

Divide a Decimal by a 2-Digit Number

The decimal point in the quotient is placed directly above its place in the dividend. In real-world situations where the division does not result in a remainder of zero, round the quotient to a specified place.

Example

2. Find $7.7 \div 14$. **Estimate** $10 \div 10 = 1$

$$\begin{array}{r} 0.55 \\ 14)7.70 \\ -70 \\ \hline 70 \\ -70 \\ \hline 0 \end{array}$$

Place the decimal point.

Annex a zero and continue dividing.

$7.7 \div 14 = 0.55$

Compared to the estimate, the quotient is reasonable.

Got it? Do these problems to find out.

d. $9.48 \div 15$

e. $3.49 \div 4$

f. $55.08 \div 17$

Show your work.

d. _____

e. _____

f. _____



Example

3. Khalid is mailing a care package to his brother. The table gives the cost for mailing packages. If Khalid's care package weighs 3 Kilograms, how much is the cost per Kilogram?

To find the cost per Kilogram, divide AED 6.74 by 3.

Weight (Kilograms)	Cost (AED)
1	4.80
2	5.63
3	6.74
4	7.87

$$\begin{array}{r}
 2.246 \\
 3 \overline{)6.740} \\
 -6 \\
 \hline
 07 \\
 -6 \\
 \hline
 14 \\
 -12 \\
 \hline
 20 \\
 -18 \\
 \hline
 2
 \end{array}$$

Place the decimal point after dividing to thousandths.

Annex a zero and continue dividing.

The remainder will never be zero.

Round 2.246 to 2.25 because hundredths are the smallest denomination used in money. It costs about AED 2.25 per Kilogram to mail the package.

Check Use a bar diagram and multiplication to check your work.



$$2.25 \times 3 = 6.75$$

$$6.75 \approx 6.74 \checkmark$$

Got it? Do this problem to find out.

g. Find the cost per kilogram of a two-kilogram and four-kilogram package.

g. _____

Dividing Money

When dividing money, it is sometimes necessary to divide to the thousandths place and then round to the hundredths.



Example

4. Ali and his sister are sharing the cost of a video game. The video game costs AED 28.60. If Ali saved AED 20 to buy the game, how much does he have left after paying his share?

Step 1

Determine how much Ali will pay.

$$\begin{array}{r}
 14.30 \\
 2)28.60 \\
 -2 \\
 \hline
 08 \\
 -8 \\
 \hline
 06 \\
 -6 \\
 \hline
 0
 \end{array}$$

Ali's share is AED 14.30.

Step 2

Determine how much Ali will have left.

$$\begin{array}{r}
 \text{AED 20.00} \\
 - \text{AED 14.30} \\
 \hline
 \text{AED 5.70}
 \end{array}$$

So, Ali has AED 5.70 left.



Got it? Do this problem to find out.

h. _____

h. Sara and her two friends are sharing the cost of a funnel cake. The funnel cake costs AED 5.49. If Sara has AED 2.00, how much will she have left after she pays her share?

Guided Practice



Divide. Round to the nearest tenth if necessary. (Examples 1 and 2)



1. $3.6 \div 4 =$ _____

2. $12.32 \div 22 =$ _____

3. $69.904 \div 34 =$ _____

4. Light travels 5.88 trillion miles in one year. How far will light travel in one month? (Examples 1 and 3) _____

5. Four dozen bagels costs AED 30.00. How much change will you receive if you pay for a dozen bagels with a ten-dirham bill? (Examples 2 and 4) _____

6. **Building on the Essential Question** How can estimating quotients help you to place the decimal correctly? _____

Rate Yourself!

How confident are you about dividing decimals by whole numbers? Check the box that applies.



Time to update your Foldable!

Independent Practice

Divide. Round to the nearest tenth if necessary. (Examples 1 and 2)

1. $39.39 \div 3 =$ _____



2. $7.24 \div 7 =$ _____

3. $118.5 \div 5 =$ _____

4. $11.4 \div 19 =$ _____

5. $55.2 \div 46 =$ _____

6. $336.752 \div 31 =$ _____

7. Ammar's family is taking a cruise that costs AED 3,082.24 for a family of four. How much does it cost per person? (Example 3)



8. Find the average height of the buildings shown in the table. (Hint: To find the average, add the values and divide by the number of values.) (Example 4)

World's Tallest Buildings (thousands of feet)				
1.667	1.483	1.483	1.451	1.381

9. **MP Be Precise** Mr. Jamal will stain the deck in his backyard. The deck has an area of 752.4 square meters. If the deck is 33 meters long, how wide is it?

Justify your procedure. _____

10. **MP Be Precise** The Verrazano-Narrows Bridge in New York City is 4.26 thousand feet long and is the seventh longest suspension bridge in the world. There are 3 feet in a yard. How long is the bridge in yards? Justify your procedure. _____



11. The Student Council is raising money by selling bottled water at a band competition. The table shows the prices for different brands. Which brand costs the least per bottle? Explain your reasoning.

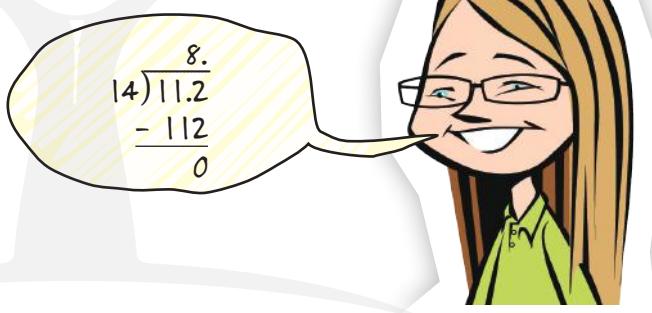
Cost of Bottled Water (20 oz bottles)		
Brand A	6-pack	AED 3.45
Brand B	12-pack	AED 5.25
Brand C	24-pack	AED 10.99

H.O.T. Problems Higher Order Thinking

12. **MP Persevere with Problems** Find each of the following quotients to detect a pattern. Then explain how you can use this pattern to mentally divide 0.0096 by 3.

$$844 \div 2 \quad 0.844 \div 2 \quad 84.4 \div 2 \quad 0.0844 \div 2 \quad 8.44 \div 2 \quad 0.00844 \div 2$$

13. **MP Find the Error** Khawla is finding $11.2 \div 14$. Find her mistake and correct it.



14. **MP Reason Inductively** Is the quotient $2.7 \div 3$ greater than or less than 1? Explain.

15. **MP Use Math Tools** Explain how you can use estimation to place the decimal point in the quotient $42.56 \div 22$.

Mohammed Bin Rashid
Smart Learning Program

16. **MP Model with Mathematics** Write a real-world problem that involves dividing a decimal by a whole number.

Extra Practice

Divide. Round to the nearest tenth if necessary.

17. $36.8 \div 2 = \underline{18.4}$



$$\begin{array}{r} 18.4 \\ 2 \overline{)36.8} \\ -2 \\ \hline 16 \\ -16 \\ \hline 08 \\ -8 \\ \hline 0 \end{array}$$

20. $10.22 \div 14 = \underline{\quad}$

18. $124.2 \div 9 = \underline{\quad}$

19. $6.271 \div 4 = \underline{\quad}$

21. $59.84 \div 32 = \underline{\quad}$

22. $751.2 \div 25 = \underline{\quad}$

23. The Ajyad Middle School students plan to have a car wash to raise AED 468.75 for a new sound system. In the past, they washed an average of 125 cars at each car wash. What should they charge per car so they can reach their goal?



24. Hind is weeding a rectangular vegetable garden. The garden has an area of 599.5 square meters. If the garden is 22 meters wide, how long is the garden? Justify your procedure.

25. **MP Use Math Tools** The table shows the prices for different party toy packages from the Tomtown Toy Company. Which item costs the least per toy? Explain your reasoning.

Cost of Party Toy Packages		
Dominoes	6-pack	AED 3.98
Peg Games	12-pack	AED 9.99
Mini Footballs	24-pack	AED 17.98

Power Up! Test Practice

26. The table shows the number of subscribers to several Internet providers.

Determine if each statement is true or false.

Internet Provider	Subscribers (millions)
Company A	2.45
Company B	3.12
Company C	2.83

a. Company B earned AED 119 million last month.
Each subscriber paid about AED 40. True False

b. Company A earned AED 126 million last month.
Each subscriber paid about AED 60. True False

c. Company C earned AED 108 million last month.
Each subscriber paid about AED 30. True False

27. Hamad completed 8 rounds of a trivia game. The scores he earned each round are shown in the table.

Round	1	2	3	4	5	6	7	8
Score	10.2	11.4	10.5	12.6	12.2	11.6	13.1	12.8

What was his average score?

Spiral Review

Add or subtract mentally. Use compensation.

28. $0.47 + 0.36 =$ _____ | 29. $26.5 - 9.3 =$ _____ | 30. $29.4 + 1.7 =$ _____

31. Use $<$, $>$, or $=$ to compare 34.3 and 34.32.

32. A king cobra has a mass of 8.845 kilograms. Round the mass to the nearest tenth kilogram.

33. The same king cobra is 4.237 meters long. Round the length to the nearest meter. _____



Divide Decimals by Decimals



Real-World Link

Art An art studio has 36 liters of acrylic paint. They separate it into 9 containers. How many liters are in each container?

Division Problem	Quotient
$36 \div 9$	

Use the division problem to find patterns and complete the tables below. Then use these patterns to describe the dividends, divisors, and quotients in each set.

1.

Division Problem	Quotient
$36 \div 0.9$	40
$36 \div 0.09$	400
$36 \div 0.009$	4,000
$36 \div 0.0009$	

2.

Division Problem	Quotient
$3.6 \div 9$	0.4
$0.36 \div 9$	0.04
$0.036 \div 9$	0.004
$0.0036 \div 9$	

3.

Division Problem	Quotient
$3.6 \div 0.9$	4
$0.36 \div 0.09$	4
$0.036 \div 0.009$	4
$0.0036 \div$	4



Essential Question

How can estimating be helpful?

MP Mathematical Practices
1, 3, 4, 5

Which **MP** Mathematical Practices did you use?
Shade the circle(s) that applies.

- ① Persevere with Problems
- ⑤ Use Math Tools
- ② Reason Abstractly
- ⑥ Attend to Precision
- ③ Construct an Argument
- ⑦ Make Use of Structure
- ④ Model with Mathematics
- ⑧ Use Repeated Reasoning



Divide by Decimals

When dividing by decimals, change the divisor into a whole number. To do this, multiply both the divisor and the dividend by the same power of 10. Then divide as with whole numbers.

Examples

1. Find $1.71 \div 0.9$. Estimate $2 \div 1 = 2$

Multiply by 10 to make a whole number.

$$\begin{array}{r} 0.9 \overline{)1.71} \\ \downarrow \quad \uparrow \\ \text{Multiply by the same number, 10.} \end{array} \quad \begin{array}{r} 1.9 \\ 9 \overline{)17.1} \\ -9 \\ \hline 81 \\ -81 \\ \hline 0 \end{array}$$

Place the decimal point.
Divide as with whole numbers.

1.71 divided by 0.9 is 1.9.

Compared to the estimate, the quotient is reasonable.

Check $1.9 \times 0.9 = 1.71$ ✓

2. Find $2.64 \div 0.6$.

Estimate $\square \div \square = \square$

$$0.6 \overline{)2.64}$$

Multiply 0.6 by \square to make a whole number.

Multiply the dividend, \square , by the same power of 10.

$$\begin{array}{r} \square \\ 0.6 \overline{)2.64} \\ \square \\ \hline \square \\ \square \\ \hline \square \end{array}$$

Place the decimal point in the quotient.

Divide as with whole numbers.

a. _____



2.64 divided by 0.6 is \square .

Compared to the estimate, is the quotient reasonable? _____

b. _____

Got it? Do these problems to find out.

c. _____

a. $54.4 \div 1.7$

b. $8.424 \div 0.36$

c. $0.0063 \div 0.007$

Zeros in the Quotient and Dividend

Line up the numbers by place value as you divide. Annex zeros in the quotient in order to keep digits with the correct place value. Annex zeros in the dividend to continue dividing after the decimal point.

Examples

3. Find $52 \div 0.4$.

$$0.4 \overline{)52.0}$$

Multiply each by 10.

$$\begin{array}{r} 130. \\ 4 \overline{)520.} \\ -4 \\ \hline 12 \\ -12 \\ \hline 00 \end{array}$$

Place the decimal point.

So, $52 \div 0.4 = 130$.

Write a zero in the ones place of the quotient because $0 \div 4 = 0$.

4. Find $0.009 \div 0.18$.

$$0.18 \overline{)0.009}$$

Multiply each by 100.

$$\begin{array}{r} 0.05 \\ 18 \overline{)0.90} \\ -0 \\ \hline 09 \\ -00 \\ \hline 90 \\ -90 \\ \hline 0 \end{array}$$

Place the decimal point.

9 tenths divided by 18 is 0, so write a 0 in the tenths place.

Annex a 0 in the dividend and continue to divide.

So, $0.009 \div 0.18$ is 0.05.

5. Find $11.2 \div 0.07$.

Multiply 0.07 and 11.2 by $\boxed{100}$.

$$0.07 \overline{)11.20}$$

Place the decimal point in the quotient.

Divide as with whole numbers.

Checking Answers

You can always check your answer to a division problem by multiplying the quotient by the divisor.

Show your work.

d. _____

e. _____

f. _____

Got it? Do these problems to find out.

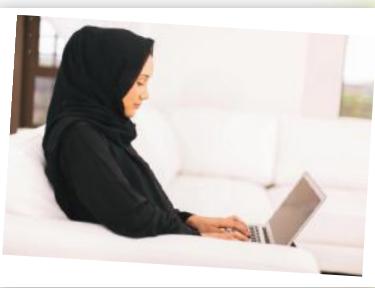
d. $5.6 \div 0.014$

e. $6.24 \div 200$

f. $0.4 \div 25$



Example



6. How many times as many Internet users are there in Japan than in Spain? Round to the nearest tenth.

Find $127.4 \div 40.4$.

$$\begin{array}{r}
 & 3.15 \\
 40.4 \overline{)127.4} & \rightarrow 404 \overline{)1274.00} \\
 & \underline{-1212} \\
 & \quad 620 \\
 & \quad -404 \\
 & \quad \underline{2160} \\
 & \quad -2020 \\
 & \quad \underline{140}
 \end{array}$$

Internet Users in 2008 (millions)

China	1,321.9
United States	301.1
Japan	127.4
France	63.7
Spain	40.4
Canada	33.4

To the nearest tenth, $127.4 \div 40.4 = 3.2$. So, there are about 3.2 times as many Internet users in Japan than in Spain.

Guided Practice



Divide. (Examples 1–5)

1. $3.69 \div 0.3 =$ _____

2. $0.0338 \div 1.3 =$ _____

3. $2.943 \div 2.7 =$ _____



4. Hind bought 5.75 yards of fleece fabric to make blankets for a charity. She needs 1.85 yards of fabric for each blanket. How many blankets can Hind make with the fabric she bought? (Example 6)

5.  **Building on the Essential Question** When is it helpful to round the quotient to the nearest hundredth?

Rate Yourself!

Are you ready to move on?
Shade the section that applies.

YES ? NO

FOLDABLES

Time to update your Foldable!

Independent Practice

Divide. (Examples 1–5)

1. $1.44 \div 0.4 =$ _____



2. $16.24 \div 0.14 =$ _____

3. $0.6 \div 0.0024 =$ _____

4. $96.6 \div 0.42 =$ _____

5. $13.5 \div 0.03 =$ _____

6. $0.12 \div 0.15 =$ _____

7. **MP Use Math Tools** The average person's *stride length*, the distance covered by one step, is approximately 2.5 feet long. How many steps would the average person take to travel 50 feet? (Example 6)

8. **STEM** Alaska has a coastline of about 10.67 thousand kilometers. Florida has about 2.17 thousand kilometers of coastline. How many times more coastline does Alaska have than Florida? Round to the nearest tenth if necessary. Justify your procedure.

9. **MP Model with Mathematics** Refer to the graphic novel frame below for Exercises a–b.



a. How many hours does Khalid need to work to earn the remainder of the money he needs to buy the video game system? _____

b. Suppose Khalid receives a raise for his hard work and now earns AED 6.25 per hour. How many hours would he need to work to earn AED 132? _____

10. A necklace is being made with beads that are 1.25 centimeters in diameter each. The necklace is 30 centimeters long. How many beads are needed? _____

11. **MP Use Math Tools** Use the table that shows popular sports car colors in United Arab Emirates.

a. How many times more respondents chose silver than red? Round to the nearest tenth if necessary.

b. How many times more respondents chose either silver or black than red? Round to the nearest tenth if necessary.

Popular Sports Car Colors	
Color	Portion of Responses
Silver	0.2
Blue	0.16
Black	0.14
Red	0.09
Other	0.41

H.O.T. Problems Higher Order Thinking

12. **MP Persevere with Problems** Find two positive decimals a and b that make the following statement true. Then find two positive decimals a and b that make the statement false.

If $a < 1$ and $b < 1$, then $a \div b < 1$.

13. **MP Which One Doesn't Belong?** Identify the problem that does not have the same quotient as the other three. Explain your reasoning.

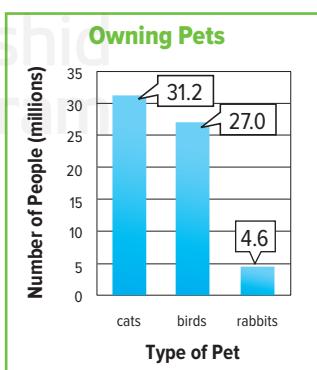
$$49 \div 7$$

$$4.9 \div 7$$

$$0.49 \div 0.7$$

$$0.049 \div 0.07$$

14. **MP Reason Inductively** Ahmad researched the number of pets owned and displayed his results in the bar graph shown. In his research, he found that AED 7,737.6 million was spent annually on veterinary visits for cats and AED 5,913 million was spent annually on visits for birds. How much more was spent on average by each person for cats than for birds?



Extra Practice

Divide.

15. $0.68 \div 3.4 = 0.2$

Homework Help 

$$\begin{array}{r}
 0.2 \\
 3.4 \overline{)0.68} \\
 -68 \\
 \hline
 0
 \end{array}$$

18. $1.08 \div 2.7 =$ _____

16. $2.07 \div 0.9 =$ _____

17. $0.16728 \div 3.4 =$ _____

19. $8.4 \div 0.02 =$ _____

20. $0.242 \div 0.4 =$ _____

21. A submarine sandwich 1.5 meters long is cut into 0.25-meters pieces. How many pieces will there be?

Show your work. 

22. **MP Use Math Tools** Find examples of decimals in a newspaper or magazine. Write a real-world problem in which you would divide decimals.

23. The table shows the five most populated countries in the world. How many times as many people live in China than in the United States? Round to the nearest tenth if necessary.

Most Populated Countries	
Country	Approximate Population (billions)
China	1.325
India	1.13
United States	0.304
Indonesia	0.235
Brazil	0.19

24. **MP Justify Conclusions** Suppose the Arabian Gulf, has a maximum depth of 1.333 thousand feet. There are 5,280 feet in one mile. How deep is the Arabian Gulf in miles? Round to the nearest hundredth if necessary. Explain your answer.



Power Up! Test Practice

25. About 24.8 million people live in Texas. About 0.6 million people live in Vermont. How many times as many people live in Texas than Vermont? Round to the nearest tenth if necessary.

26. The table shows the time it took several members of a cycling club to bike different distances. Sort the cyclists from least to greatest unit rate.

Cyclist	Rate (km/min)
Least	
Greatest	

Member	Distance (mi)	Time (min)
Ahmad	5.8	23.2
Khalid	7.2	40
Ali	6.25	31.25
Yousef	6.75	28.125

Spiral Review

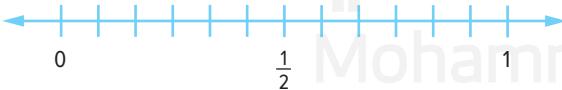
Fill in each \bigcirc with $<$, $>$, or $=$ to make a true sentence.

27. $\frac{2}{4} \bigcirc \frac{5}{8}$

28. $\frac{6}{12} \bigcirc \frac{5}{10}$

29. $\frac{1}{2} \bigcirc \frac{6}{14}$

30. Plot the fraction $\frac{7}{12}$ on the number line. Is $\frac{7}{12}$ closer to 0, $\frac{1}{2}$, or 1?



31. Laila spent $\frac{1}{6}$ of her free time practicing soccer and $\frac{5}{12}$ of her free time playing a video game. What fraction of her free time did she spend on these two activities?



21ST CENTURY CAREER

in Design

Sports Equipment Designer

Do you have a passion for sports and a strong interest in science? Are you a creative thinker who always has new ideas or better ways of doing things? If so, then you should consider a career designing sports equipment.

Sports equipment designers combine creativity and engineering principles to create equipment that is cutting edge and helps improve athletic performance. They design everything from baseball bats and footballs to lacrosse protective gear and racing wheelchairs.



Is This the Career for You?

Are you interested in a career as a sports equipment designer? Take some of the following courses in high school.

- ◆ Algebra
- ◆ Biology
- ◆ Calculus
- ◆ Computer Science
- ◆ Physics

Find out how math relates to a career in Design.



MP Gaining a Competitive Edge

When a punter kicks a football, the ball has both horizontal motion and vertical motion. The table shows these values when a football is kicked at 25 meters per second.

Use the information in the table to solve each problem. Assume that each football is kicked at 25 meters per second. Round to the nearest tenth if necessary.

1. The *hang time*, or time that a football is in the air, of a football that is kicked at a 27° angle is given by 0.204×11.3 . What is the approximate hang time? _____
2. How much greater is the hang time of a football that is kicked at a 62° angle than one that is kicked at a 45° angle? Use the expressions 0.204×22.1 and 0.204×17.7 .

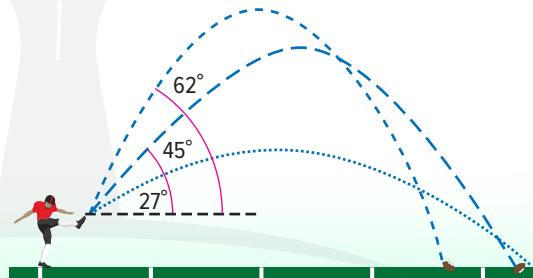
3. The final distance from the punter to a football kicked at a 27° angle is approximately $22.3 \times 11.3 \times 0.2$. What is the distance from the punter to the football?

4. Find the distance of a football that is kicked at an angle of 62° if the distance is found by using the expression $11.7 \times 22.1 \times 0.2$.

5. The hang time of a football is about 3 seconds. Find $3 \div 0.204$ to determine the vertical motion of the football.

6. A football reaches its maximum height in $y \div 9.8$ seconds. A football is kicked at a 62° angle. At the same time, another football is kicked at a 27° angle. Which reaches its maximum height first? Explain.

Punting A Football		
Angle of Kick	Horizontal Motion (m/s)	Vertical Motion (m/s)
	x	y
27°	22.3	11.3
45°	17.7	17.7
62°	11.7	22.1



MP Career Project

It's time to update your career portfolio! Choose a piece of sports equipment and describe how it has changed over the past 20 years. List the reasons for the changes.

Suppose you are an employer hiring a sports equipment designer. What questions would you ask a potential employee?

- _____
- _____
- _____

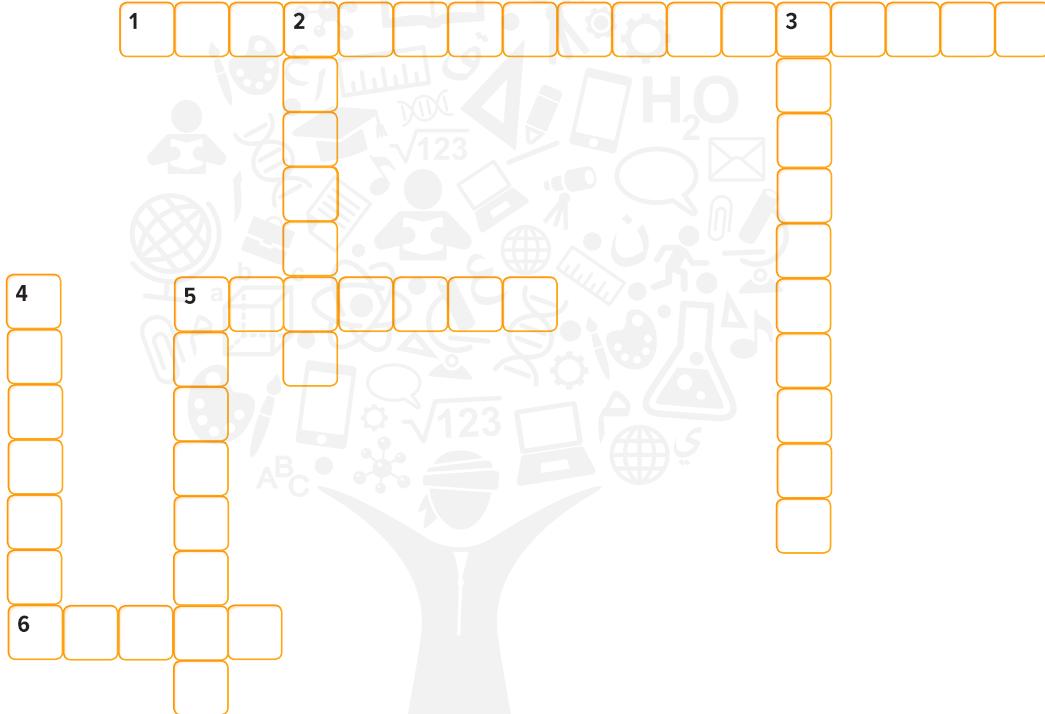
Chapter Review



Vocabulary Check



Write the correct term for each clue in the crossword puzzle.



Across

1. easy to divide mentally
5. a number that has a digit in the tenths place, hundredths place, or beyond
6. to find an approximate value for a number

Down

2. the answer to a multiplication problem
3. a number with more than one digit
4. the number by which the dividend is being divided
5. a number that is being divided

Use Your **FOLDABLES®**

Use your Foldable to help review the chapter.

Tape here

Divide with Decimals

Examples

Examples

Got it?

Complete the cross number puzzle by solving the problems.

1	2	3		
	4			
5		6		7
	8			
9				11
	10			
12		13		

Across

- 34.5×14
- $569.6 \div 3.2$
- 18.5×40
- $50.4 \div 2.4$
- $562.39 + 304.61$
- 42.5×116
- 339.2×2.5
- $1,584 \div 4.5$
- $1,218 \div 6$

Down

- $24.3 + 15.7$
- 21.2×17.5
- 33.75×3.2
- $146.53 + 92.47$
- $2,628 \div 36.5$
- 24×4.5
- $263.4 + 199.6$
- 35.2×25

Power Up! Performance Task

Calorie Counter

Ahmed is calculating how many Calories he consumes in a day. Through Internet research, he determines that a person his age should consume 68,820 Calories per month.

Write your answers on another piece of paper. Show all of your work to receive full credit.

Part A

Based on a 31-day month, how many Calories should Ahmed consume in a day?

Part B

Ahmed wants to eat fewer than 800 Calories at lunch. The table shows the menu at the school cafeteria with the Calorie totals listed for each item. Find two different meal options for Ahmed to choose for lunch. Then find the cost for each meal.

Food Item	Calories	Cost (AED)
Carrots	41	0.80
Chocolate Cake (slice)	513	2.10
Cookie	253	1.45
Corn Dog	212	1.50
French Fries	103	1.10
Green Beans	39	0.80
Beefburger	449	2.50
Pepperoni Pizza (slice)	334	1.75
Salisbury Steak	342	2.30

Part C

Ahmed has a budget of AED 20.00 for lunch each week. Choose one of the meals from Part B for Ahmed's lunch on Monday. How much does he have left for the rest of the week? How much could he spend each remaining day, if he spends the same amount each day?

Part D

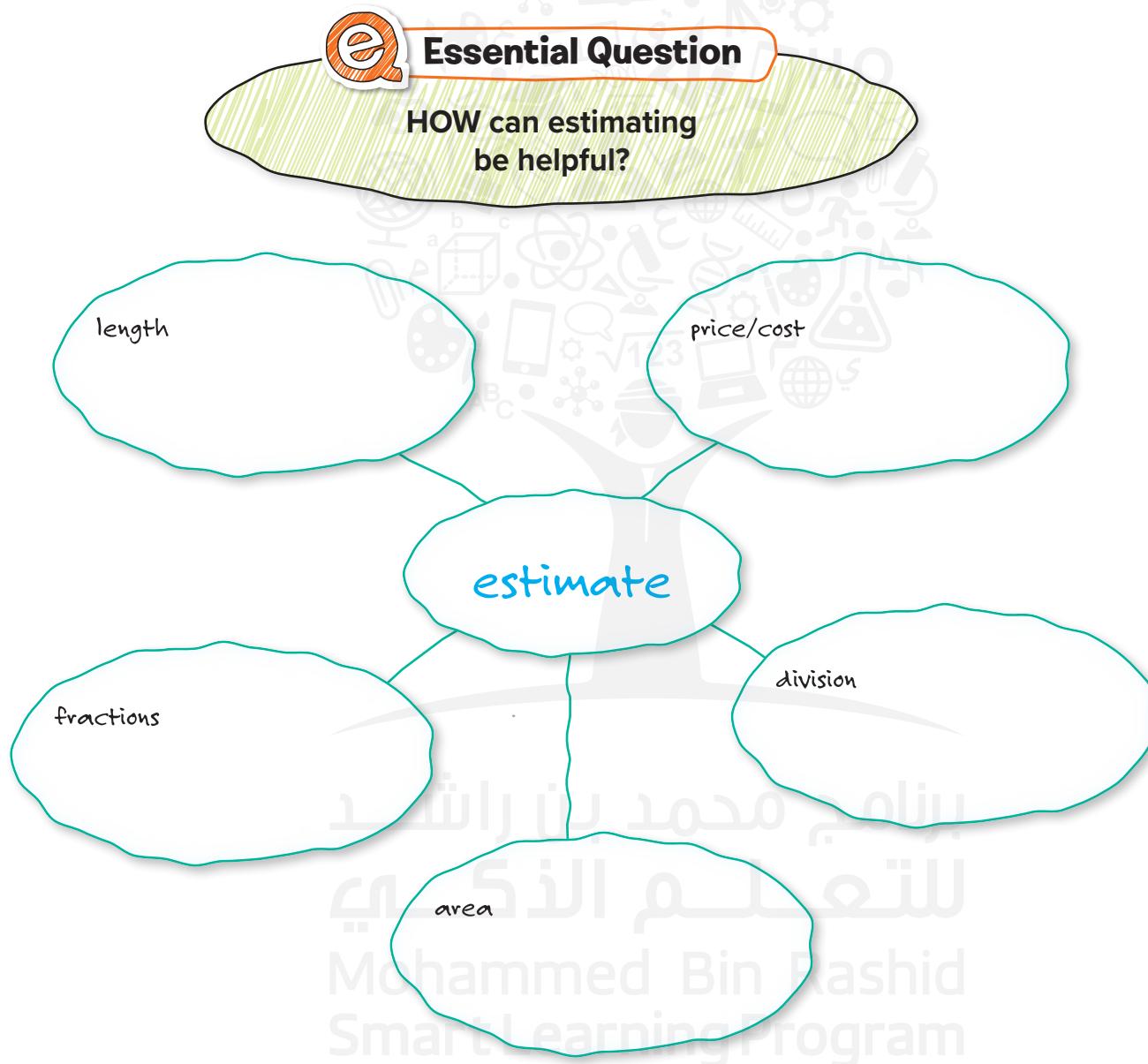
On game day, the entire basketball team eats together. There are 12 players on the team. Each player eats two slices of pizza, carrots, and a cookie. Find the total cost of the team's lunch.

Reflect



Answering the Essential Question

Use what you learned about computing with multi-digit numbers to complete the graphic organizer.



Answer the Essential Question. HOW can estimating be helpful?