Chapter 2

Divide Whole Numbers

Show What You Know

Check your understanding of important skills.

Name _____

▶ Meaning of Division Use counters to solve.

1. Divide 18 counters into 3 equal groups. How many counters are in each group?

   _____ counters

2. Divide 21 counters into 7 equal groups. How many counters are in each group?

   _____ counters

▶ Multiply 3-Digit and 4-Digit Numbers Multiply.

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

4. $\begin{array}{r} 518 \\ \times \quad 7 \\ \hline \end{array}$

5. $\begin{array}{r} 4{,}092 \\ \times \quad 6 \\ \hline \end{array}$

6. $\begin{array}{r} 8{,}264 \\ \times \quad 9 \\ \hline \end{array}$

▶ Estimate with 1-Digit Divisors Estimate the quotient.

7. $2\overline{)312}$

8. $4\overline{)189}$

9. $6\overline{)603}$

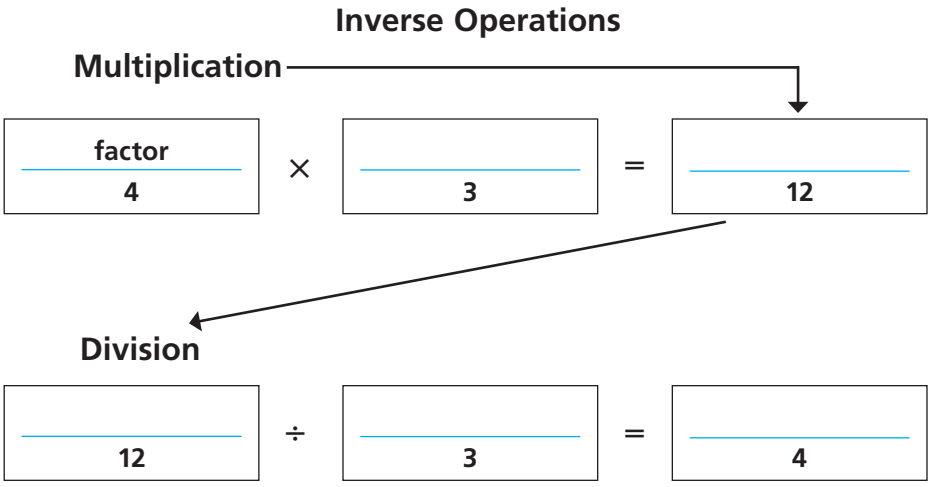
10. $3\overline{)1{,}788}$

The height of the Gateway Arch shown on the Missouri quarter is 630 feet, or 7,560 inches. Be a math detective to find how many 4-inch stacks of quarters make up the height of the Gateway Arch. If there are 58 quarters in a 4-inch stack, how many quarters high is the arch?

Vocabulary Builder

Visualize It

Complete the Flow Map using the words with a ✓.



Review Words

- compatible numbers
- ✓dividend
- ✓divisor
- estimate
- ✓factor
- partial quotients
- ✓product
- ✓quotient
- remainder

Understand Vocabulary

Use the review words to complete each sentence.

1. You can _____ to find a number that is close to the exact amount.

2. Numbers that are easy to compute with mentally are called _____.

3. The _____ is the amount left over when a number cannot be divided evenly.

4. A method of dividing in which multiples of the divisor are subtracted from the dividend and then the quotients are added together is called _____.

5. The number that is to be divided in a division problem is the _____.

6. The _____ is the number, not including the remainder, that results from dividing.

Name _____

Place the First Digit

Essential Question How can you tell where to place the first digit of a quotient without dividing?

UNLOCK the Problem REAL WORLD

Tania has 8 purple daisies. In all, she counts 128 petals on her flowers. If each flower has the same number of petals, how many petals are on one flower?

- Underline the sentence that tells you what you are trying to find.
- Circle the numbers you need to use.
- How will you use these numbers to solve the problem?

_____

Divide. 128 ÷ 8

STEP 1 Use an estimate to place the first digit in the quotient.

Estimate. 160 ÷ _____ = _____

The first digit of the quotient will be in the _____ place.

STEP 2 Divide the tens.

$$\begin{array}{r} 1 \\ 8\overline{)128} \\ -\ \square \\ \hline \square \end{array}$$

Divide. 12 tens ÷ 8
Multiply. 8 × 1 ten
Subtract. 12 tens − _____ tens
Check. _____ tens cannot be shared among 8 groups without regrouping.

STEP 3 Regroup any tens left as ones. Then, divide the ones.

$$\begin{array}{r} 16 \\ 8\overline{)128} \\ -8\downarrow \\ \hline \square \\ -\ \square \\ \hline \square \end{array}$$

Divide. 48 ones ÷ 8
Multiply. 8 × 6 ones
Subtract. 48 ones − _____ ones
Check. _____ ones cannot be shared among 8 groups.

Math Talk MATHEMATICAL PRACTICES

Explain how estimating the quotient helps you at both the beginning and the end of a division problem.

Since 16 is close to the estimate of _____, the answer is reasonable.

So, there are 16 petals on one flower.

Example

Divide. Use place value to place the first digit. 4,236 ÷ 5

STEP 1 Use place value to place the first digit.

$5\overline{)4{,}236}$

Look at the thousands.

4 thousands cannot be shared among 5 groups without regrouping.

Look at the hundreds.

_____ hundreds can be shared among 5 groups.

The first digit is in the _____ place.

STEP 2 Divide the hundreds.

$$\begin{array}{r} 8 \\ 5\overline{)4{,}236} \\ -\ \square\square\square \\ \hline \square\square\square \end{array}$$

Divide. _____ hundreds ÷ _____

Multiply. _____ × _____ hundreds

Subtract. _____ hundreds − _____ hundreds

Check. _____ hundreds cannot be shared among 5 groups without regrouping.

STEP 3 Divide the tens.

$$\begin{array}{r} 84 \\ 5\overline{)4{,}236} \\ -40 \\ \hline 23 \\ -20 \\ \hline 3 \end{array}$$

Divide. _____

Multiply. _____

Subtract. _____

Check. _____

_____

STEP 4 Divide the ones.

$$\begin{array}{r} 847 \\ 5\overline{)4{,}236} \\ -40 \\ \hline 23 \\ -20 \\ \hline 36 \\ -35 \\ \hline 1 \end{array}$$

Divide. _____

Multiply. _____

Subtract. _____

Check. _____

_____

So, 4,236 ÷ 5 is _____ r_____.

Remember

Remember to estimate the quotient first.

Estimate: 4,000 ÷ 5 = _____

MATHEMATICAL PRACTICES

Math Talk **Explain** how you know if your answer is reasonable.

Name _____

Share and Show

Divide.

1. $3\overline{)579}$

2. $5\overline{)1,035}$

3. $8\overline{)1,766}$

MATHEMATICAL PRACTICES

Math Talk As you divide, **explain** how you know when to place a zero in the quotient.

On Your Own

Divide.

4. $8\overline{)275}$

5. $3\overline{)468}$

6. $4\overline{)3,220}$

7. $6\overline{)618}$

8. $4\overline{)716}$

9. $9\overline{)1,157}$

10. $6\overline{)6,827}$

11. $7\overline{)8,523}$

Practice: Copy and Solve Divide.

12. $645 \div 8$

13. $942 \div 6$

14. $723 \div 7$

15. $3,478 \div 9$

16. $3,214 \div 5$

17. $492 \div 4$

18. $2,403 \div 9$

19. $2,205 \div 6$

20. $2,426 \div 3$

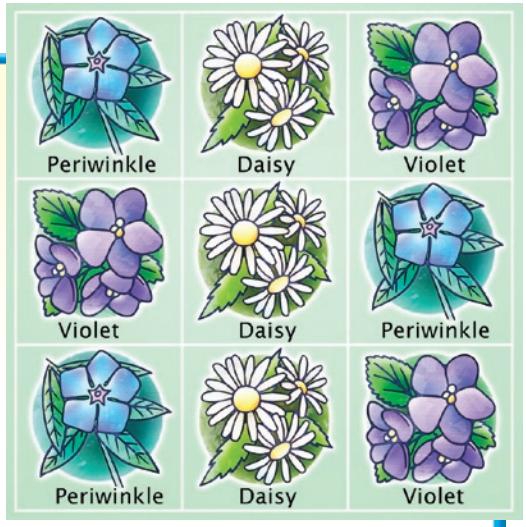
21. $1,592 \div 8$

22. $926 \div 4$

23. $6,033 \div 5$

UNLOCK the Problem REAL WORLD

24. Rosa has a garden divided into sections. She has 125 daisy plants. If she plants an equal number of the daisy plants in each section of daisies, will she have any left over? If so, how many daisy plants will be left over?



a. What information will you use to solve the problem? _____

_____

b. How will you use division to find the number of daisy plants left over? _____

_____

_____

c. Show the steps you use to solve the problem. Estimate: $120 \div 3 =$ _____

d. Complete the sentences:

Rosa has _____ daisy plants. She puts an equal number in each of _____ sections.

Each section has _____ plants.

Rosa has _____ daisy plants left over.

25. H.O.T. One case can hold 3 boxes. Each box can hold 3 binders. How many cases are needed to hold 126 binders?

_____

26. **Test Prep** In which place is the first digit in the quotient $1{,}497 \div 5$?

Ⓐ thousands

Ⓑ hundreds

Ⓒ tens

Ⓓ ones

FOR MORE PRACTICE:
Standards Practice Book, pp. P31–P32

Name _____

Divide by 1-Digit Divisors

Essential Question How do you solve and check division problems?

UNLOCK the Problem REAL WORLD

Jenna's family is planning a trip to Oceanside, California. They will begin their trip in Scranton, Pennsylvania, and will travel 2,754 miles over 9 days. If the family travels an equal number of miles every day, how far will they travel each day?

- Underline the sentence that tells you what you are trying to find.
- Circle the numbers you need to use.

Divide. 2,754 ÷ 9

STEP 1

Use an estimate to place the first digit in the quotient.

Estimate. 2,700 ÷ 9 = _____

The first digit of the quotient is in the _____ place.

STEP 2

Divide the hundreds.

STEP 3

Divide the tens.

STEP 4

Divide the ones.

$$9\overline{)2,754}$$
$$-$$
$$-$$
$$-$$

Since _____ is close to the estimate of _____, the answer is reasonable.

So, Jenna's family will travel _____ miles each day.

MATHEMATICAL PRACTICES

Math Talk **Explain** how you know the quotient is 306 and not 36.

CONNECT Division and multiplication are inverse operations. Inverse operations are opposite operations that undo each other. You can use multiplication to check your answer to a division problem.

Example Divide. Check your answer.

To check your answer to a division problem, multiply the quotient by the divisor. If there is a remainder, add it to the product. The result should equal the dividend.

$$\begin{array}{r} 102 \text{ r}2 \\ 6\overline{)614} \\ -6 \\ \hline 01 \\ -0 \\ \hline 14 \\ -12 \\ \hline 2 \end{array}$$

102	← quotient
× 6	← divisor
____	
+ 2	← remainder
____	← dividend

Since the result of the check is equal to the dividend, the division is correct.

So, 614 ÷ 6 is ______.

You can use what you know about checking division to find an unknown value.

Try This! **Find the unknown number by finding the value of *n* in the related equation.**

A

$$7\overline{)\square}\quad\text{quotient } 63$$

$n = 7 \times 63$

↑ dividend ↑ divisor ↑ quotient

Multiply the divisor and the quotient.

$n =$ ______

B

$$6\overline{)752}\quad 125 \text{ r } \square$$

$752 = 6 \times 125 + n$

↑ dividend ↑ divisor ↑ quotient ↑ remainder

Multiply the divisor and the quotient.

$752 = 750 + n$

Think: What number added to 750 equals 752?

$n =$ ______

Name _____

Share and Show

Divide. Check your answer.

1. $8\overline{)624}$ Check.

2. $4\overline{)3{,}220}$ Check.

3. $4\overline{)1{,}027}$ Check.

MATHEMATICAL PRACTICES

Math Talk **Explain** how multiplication can help you check a quotient.

On Your Own

Divide.

4. $6\overline{)938}$

5. $4\overline{)762}$

6. $3\overline{)5{,}654}$

7. $8\overline{)475}$

Practice: Copy and Solve **Divide.**

8. $4\overline{)671}$

9. $9\overline{)2{,}023}$

10. $3\overline{)4{,}685}$

11. $8\overline{)948}$

12. $1{,}326 \div 4$

13. $5{,}868 \div 6$

14. $566 \div 3$

15. $3{,}283 \div 9$

Algebra **Find the value of *n* in each equation. Write what *n* represents in the related division problem.**

16. $n = 4 \times 58$

$n =$ _____

17. $589 = 7 \times 84 + n$

$n =$ _____

18. $n = 5 \times 67 + 3$

$n =$ _____

Problem Solving REAL WORLD

Use the table to solve 19–20.

Large Gold Nuggets Found

Name	Weight	Location
Welcome Stranger	2,284 troy ounces	Australia
Welcome	2,217 troy ounces	Australia
Willard	788 troy ounces	California

19. If the Welcome gold nugget were turned into 3 equal-sized gold bricks, how many troy ounces would each brick weigh?

20. **Pose a Problem** Look back at Problem 19. Write a similar problem by changing the nugget and the number of bricks. Then solve the problem.

SHOW YOUR WORK

21. H.O.T. There are 246 students going on a field trip to pan for gold. If they are going in vans that hold 9 students each, how many vans are needed? How many students will ride in the van that isn't full?

22. One crate can hold 8 cases of trading cards. How many crates are needed to hold 128 cases of trading cards?

23. **Test Prep** At a bake sale, a fifth-grade class sold 324 cupcakes in packages of 6. How many packages of cupcakes did the class sell?

Ⓐ 1,944 Ⓒ 64

Ⓑ 108 Ⓓ 54

FOR MORE PRACTICE:
Standards Practice Book, pp. P33–P34

Name _____

Division with 2-Digit Divisors

Essential Question How can you use base-ten blocks to model and understand division of whole numbers?

Investigate

Materials ■ base-ten blocks

There are 156 students in the Carville Middle School chorus. The music director wants the students to stand with 12 students in each row for the next concert. How many rows will there be?

A. Use base-ten blocks to model the dividend, 156.

B. Place 2 tens below the hundred to form a rectangle. How many groups of 12 does the rectangle show? How much of the dividend is not shown in this rectangle?

_____

C. Combine the remaining tens and ones into as many groups of 12 as possible. How many groups of 12 are there?

_____

D. Place these groups of 12 on the right side of the rectangle to make a larger rectangle.

E. The final rectangle shows _____ groups of 12.

So, there will be _____ rows of 12 students.

Draw Conclusions

1. **Explain** why you still need to make groups of 12 after Step B.

_____

_____

2. **Describe** how you can use base-ten blocks to find the quotient 176 ÷ 16.

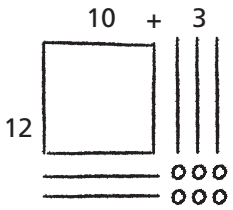
_____

_____

_____

Make Connections

The two sets of groups of 12 that you found in the Investigate are partial quotients. First you found 10 groups of 12 and then you found 3 more groups of 12. Sometimes you may need to regroup before you can show a partial quotient.



You can use a quick picture to record the partial products.

Divide. 180 ÷ 15

MODEL Use base-ten blocks.

STEP 1 Model the dividend, 180, as 1 hundred 8 tens.

Model the first partial quotient by making a rectangle with the hundred and 5 tens. In the Record, cross out the hundred and tens you use.

The rectangle shows _____ groups of 15.

STEP 2 Additional groups of 15 cannot be made without regrouping.

Regroup 1 ten as 10 ones. In the Record, cross out the regrouped ten.

There are now _____ tens and _____ ones.

STEP 3 Decide how many additional groups of 15 can be made with the remaining tens and ones. The number of groups is the second partial quotient.

Make your rectangle larger by including these groups of 15. In the Record, cross out the tens and ones you use.

There are now _____ groups of 15.

So, 180 ÷ 15 is _____.

RECORD Use quick pictures.

Draw the first partial quotient.

Draw the first and second partial quotients.

Math Talk MATHEMATICAL PRACTICES

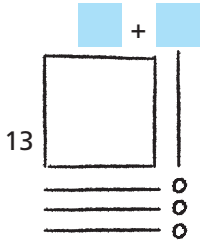
Explain how your model shows the quotient.

Share and Show

MATH BOARD

Use the quick picture to divide.

1. 143 ÷ 13



Name _____

Divide. Use base-ten blocks.

2. 168 ÷ 12

3. 154 ÷ 14

4. 187 ÷ 11

Divide. Draw a quick picture.

5. 165 ÷ 11

6. 216 ÷ 18

7. 196 ÷ 14

8. 195 ÷ 15

9. 182 ÷ 13

10. 228 ÷ 12

MATHEMATICAL PRACTICES

Math Talk **Explain** how Exercise 10 is different from Exercises 7-9.

Connect to Social Studies

Pony Express

The Pony Express used men riding horses to deliver mail between St. Joseph, Missouri, and Sacramento, California, from April, 1860 to October, 1861. The trail between the cities was approximately 2,000 miles long. The first trip from St. Joseph to Sacramento took 9 days 23 hours. The first trip from Sacramento to St. Joseph took 11 days 12 hours.

Before the Pony Express ended in 1861, there were 100 stations, 80 riders, and 400 to 500 horses. The riders were young men about 20 years old who weighed about 120 pounds. Each rider rode 10 to 15 miles before getting a fresh horse. Riders rode a total of 75 to 100 miles each trip.

Solve.

11. Suppose two Pony Express riders rode a total of 165 miles. If they replaced each horse with a fresh horse every 11 miles, how many horses would they have used?

_____

12. Suppose a Pony Express rider was paid $192 for 12 weeks of work. If he was paid the same amount each week, how much was he paid for each week of work?

_____

13. Suppose three riders rode a total of 240 miles. If they used a total of 16 horses, and rode each horse the same number of miles, how many miles did they ride before replacing each horse?

_____

14. H.O.T. Suppose it took 19 riders a total of 11 days 21 hours to ride from St. Joseph to Sacramento. If they all rode the same number of hours, how many hours did each rider ride?

_____

FOR MORE PRACTICE:
Standards Practice Book, pp. P35–P36

Name _____

Partial Quotients

Essential Question How can you use partial quotients to divide by 2-digit divisors?

UNLOCK the Problem REAL WORLD

People in the United States eat about 23 pounds of pizza per person every year. If you ate that much pizza each year, how many years would it take you to eat 775 pounds of pizza?

- Rewrite in one sentence the problem you are asked to solve.

_____

_____

Divide by using partial quotients.

775 ÷ 23

STEP 1

Subtract multiples of the divisor from the dividend until the remaining number is less than the multiple. The easiest partial quotients to use are multiples of 10.

STEP 2

Subtract smaller multiples of the divisor until the remaining number is less than the divisor. Then add the partial quotients to find the quotient.

COMPLETE THE DIVISION PROBLEM.

23)775		
− ____	10 × 23	10
545		

775 ÷ 23 is _____ r _____.

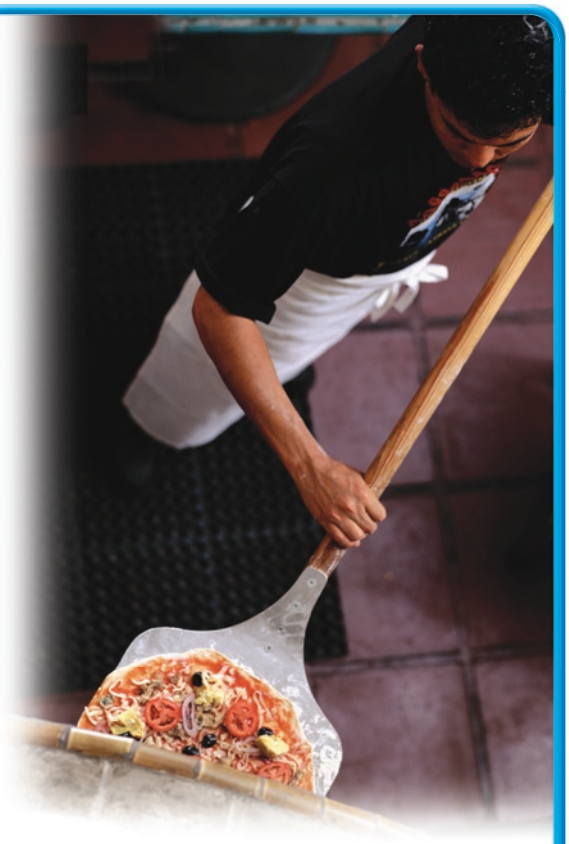
So, it would take you more than 33 years to eat 775 pounds of pizza.

Remember

Depending on the question, a remainder may or may not be used in answering the question. Sometimes the quotient is adjusted based on the remainder.

Example

Myles is helping his father with the supply order for his pizza shop. For next week, the shop will need 1,450 ounces of mozzarella cheese. Each package of cheese weighs 32 ounces. Complete Myles's work to find how many packages of mozzarella cheese he needs to order.



32)1,450		
− 320	____ × 32	
1,130		
− 320	____ × 32	
810		
−320	____ × 32	
490		
−320	____ × 32	
170		
−160	____ × 32	+ ____
10		

1,450 ÷ 32 is _____ r _____.

So, he needs to order _____ packages of mozzarella cheese.

MATHEMATICAL PRACTICES

Math Talk What does the remainder represent? **Explain** how the remainder will affect your answer.

Try This! **Use different partial quotients to solve the problem above.**

32)1,450

Math Idea

Using different multiples of the divisor to find partial quotients provides many ways to solve a division problem. Some ways are quicker, but all result in the same answer.

Name _____

Share and Show

Divide. Use partial quotients.

1. $18\overline{)648}$

2. $62\overline{)3,186}$

3. $858 \div 57$

Math Talk MATHEMATICAL PRACTICES

Explain what the greatest possible whole-number remainder is if you divide any number by 23.

On Your Own

Divide. Use partial quotients.

4. $73\overline{)584}$

5. $51\overline{)1,831}$

6. $82\overline{)2,964}$

7. $892 \div 26$

8. $1,056 \div 48$

9. $2,950 \div 67$

Practice: Copy and Solve Divide. Use partial quotients.

10. $653 \div 42$

11. $946 \div 78$

12. $412 \div 18$

13. $871 \div 87$

14. $1,544 \div 34$

15. $2,548 \div 52$

16. $2,740 \div 83$

17. $4,135 \div 66$

Problem Solving REAL WORLD

Use the table to solve 18–20 and 22.

Each year each person in the U.S. eats about...
- 68 quarts of popcorn
- 53 pounds of bread
- 19 pounds of apples
- 14 pounds of turkey

18. How many years would it take for a person in the United States to eat 855 pounds of apples?

19. How many years would it take for a person in the United States to eat 1,120 pounds of turkey?

SHOW YOUR WORK

20. If 6 people in the United States each eat the average amount of popcorn for 5 years, how many quarts of popcorn will they eat?

21. H.O.T. In a study, 9 people ate a total of 1,566 pounds of potatoes in 2 years. If each person ate the same amount each year, how many pounds of potatoes did each person eat in 1 year?

22. Write Math **Sense or Nonsense?** In the United States, a person eats more than 40,000 pounds of bread in a lifetime if he or she lives to be 80 years old. Does this statement make sense, or is it nonsense? **Explain**.

23. **Test Prep** The school auditorium has 448 seats arranged in 32 equal rows. How many seats are in each row?

Ⓐ 14,336
Ⓒ 416
Ⓑ 480
Ⓓ 14

FOR MORE PRACTICE:
Standards Practice Book, pp. P37–P38

Name _____

Mid-Chapter Checkpoint

Concepts and Skills

1. **Explain** how estimating the quotient helps you place the first digit in the quotient of a division problem.

2. **Explain** how to use multiplication to check the answer to a division problem.

Divide.

3. 633 ÷ 3

4. 487 ÷ 8

5. 1,641 ÷ 4

6. 2,765 ÷ 9

Divide. Use partial quotients.

7. 156 ÷ 13

8. 318 ÷ 53

9. 1,562 ÷ 34

10. 4,024 ÷ 68

Fill in the bubble completely to show your answer.

11. Emma is planning a party for 128 guests. If 8 guests can be seated at each table, how many tables will be needed for seating at the party?

Ⓐ 8

Ⓑ 14

Ⓒ 16

Ⓓ 17

12. Tickets for the basketball game cost $14 each. If the sale of the tickets brought in $2,212, how many tickets were sold?

Ⓐ 150

Ⓑ 158

Ⓒ 168

Ⓓ 172

13. Margo used 864 beads to make necklaces for the art club. She made 24 necklaces with the beads. If each necklace has the same number of beads, how many beads did Margo use for each necklace?

Ⓐ 24

Ⓑ 36

Ⓒ 37

Ⓓ 60

14. Angie needs to buy 156 candles for a party. Each package has 8 candles. How many packages should Angie buy?

Ⓐ 17

Ⓑ 18

Ⓒ 19

Ⓓ 20

Name _____

Estimate with 2-Digit Divisors

Essential Question How can you use compatible numbers to estimate quotients?

CONNECT You can estimate quotients using compatible numbers that are found by using basic facts and patterns.

$35 \div 5 = 7$ ← basic fact
$350 \div 50 = 7$
$3{,}500 \div 50 = 70$
$35{,}000 \div 50 = 700$

UNLOCK the Problem REAL WORLD

The observation deck of the Willis Tower in Chicago, Illinois, is 1,353 feet above the ground. Elevators lift visitors to that level in 60 seconds. About how many feet do the elevators travel per second?

Willis Tower, formerly known as the Sears Tower, is the tallest building in the United States.

Estimate. 1,353 ÷ 60

STEP 1

Use two sets of compatible numbers to find two different estimates.

1,353 ÷ 60	1,353 ÷ 60
↓	↓
1,200 ÷ 60	1,800 ÷ 60

STEP 2

Use patterns and basic facts to help estimate.

12 ÷ 6 = _____	18 ÷ 6 = _____
120 ÷ 60 = _____	_____ ÷ _____ = _____
1,200 ÷ 60 = _____	_____ ÷ _____ = _____

The elevators travel about _____ to _____ feet per second.

The more reasonable estimate is _____ because

_____ is closer to 1,353 than _____ is.

So, the observation deck elevators in the Willis Tower travel about _____ feet per second.

Example Estimate money.

Miriam has saved $650 to spend during her 18-day trip to Chicago. She doesn't want to run out of money before the trip is over, so she plans to spend about the same amount each day. Estimate how much she can spend each day.

Estimate. $18\overline{)\$650}$

$600 ÷ _____ = $30 or _____ ÷ 20 = $40

So, Miriam can spend about _____ to _____ each day.

Math Talk MATHEMATICAL PRACTICES

Would it be more reasonable to have an estimate or an exact answer for this example? **Explain** your reasoning.

- Given Miriam's situation, which estimate do you think is the better one for her to use? **Explain** your reasoning. _____

_____

_____

Try This! Use compatible numbers.

Find two estimates.

$52\overline{)415}$

Estimate the quotient.

$38\overline{)\$2,764}$

Share and Show MATH BOARD

Use compatible numbers to find two estimates.

1. $22\overline{)154}$

$140 ÷ 20 =$ _____

$160 ÷ 20 =$ _____

2. $68\overline{)503}$

3. $81\overline{)7,052}$

4. $33\overline{)291}$

5. $58\overline{)2,365}$

6. $19\overline{)5,312}$

Name _____

On Your Own

Use compatible numbers to find two estimates.

7. $42\overline{)396}$

8. $59\overline{)413}$

9. $28\overline{)232}$

10. $22\overline{)368}$

11. $78\overline{)375}$

12. $88\overline{)6{,}080}$

13. $5{,}821 \div 71$

14. $1{,}565 \div 67$

15. $7{,}973 \div 91$

Use compatible numbers to estimate the quotient.

16. $19\overline{)228}$

17. $25\overline{)\$595}$

18. $86\overline{)7{,}130}$

19. $83\overline{)462}$

20. $27\overline{)9{,}144}$

21. $68\overline{)710}$

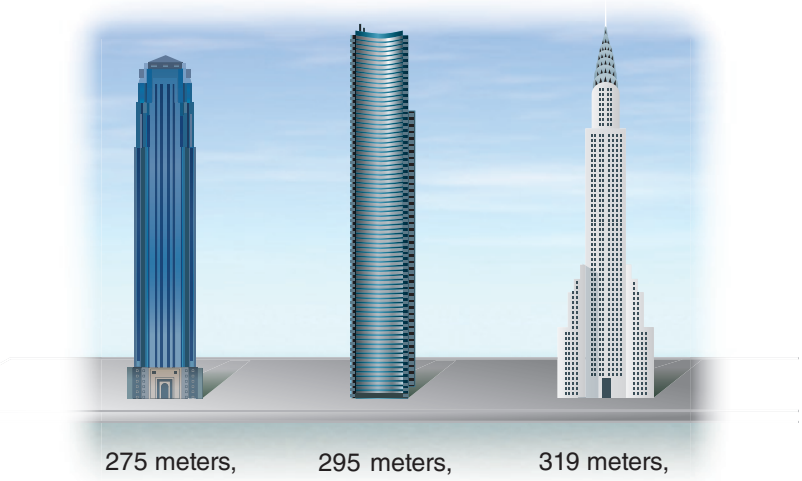
22. $707 \div 36$

23. $1{,}198 \div 41$

24. $5{,}581 \div 72$

Problem Solving REAL WORLD

Use the picture to solve 25–26.



275 meters, 64 floors, Williams Tower, Texas

295 meters, 76 floors, Columbia Center, Washington

319 meters, 77 floors, Chrysler Building, New York

25. About how many meters tall is each floor of the Williams Tower?

26. About how many meters tall is each floor of the Chrysler Building?

27. H.O.T. Eli needs to save $235. To earn money, he plans to mow lawns and charge $21 for each. Write two estimates Eli could use to determine the number of lawns he needs to mow. Decide which estimate you think is the better one for Eli to use. **Explain** your reasoning.

SHOW YOUR WORK

28. Write Math **Explain** how you know whether the quotient of 298 ÷ 31 is closer to 9 or to 10.

29. **Test Prep** Anik built a tower of cubes. It was 594 millimeters tall. The height of each cube was 17 millimeters. About how many cubes did Anik use?

Ⓐ 10 Ⓒ 30

Ⓑ 16 Ⓓ 300

FOR MORE PRACTICE:
Standards Practice Book, pp. P39–P40

Name _____

Divide by 2-Digit Divisors

Essential Question How can you divide by 2-digit divisors?

UNLOCK the Problem REAL WORLD

Mr. Yates owns a smoothie shop. To mix a batch of his famous orange-punch smoothies, he uses 18 ounces of freshly squeezed orange juice. Each day he squeezes 560 ounces of fresh orange juice. How many batches of orange-punch smoothies can Mr. Yates make in a day?

- Underline the sentence that tells you what you are trying to find.
- Circle the numbers you need to use.

Divide. 560 ÷ 18 **Estimate.** _____

STEP 1 Use the estimate to place the first digit in the quotient.

$18\overline{)560}$

The first digit of the quotient will be in the _____ place.

STEP 2 Divide the tens.

$$\begin{array}{r} 3 \\ 18\overline{)560} \\ -\ 54 \\ \hline 2 \end{array}$$

Divide. 56 tens ÷ 18

Multiply. _____

Subtract. _____

Check. 2 tens cannot be shared among 18 groups without regrouping.

STEP 3 Divide the ones.

$$\begin{array}{r} 31\ r2 \\ 18\overline{)560} \\ -\ 54\downarrow \\ \hline 20 \\ -\ 18 \\ \hline 2 \end{array}$$

Divide. _____

Multiply. _____

Subtract. _____

Check. _____

_____

MATHEMATICAL PRACTICES

Math Talk **Explain** what the remainder 2 represents.

Since 31 is close to the estimate of 30, the answer is reasonable.
So, Mr. Yates can make 31 batches of orange-punch smoothies each day.

Example

Every Wednesday, Mr. Yates orders fruit. He has set aside $1,250 to purchase Valencia oranges. Each box of Valencia oranges costs $41. How many boxes of Valencia oranges can Mr. Yates purchase?

You can use multiplication to check your answer.

Divide. 1,250 ÷ 41

DIVIDE

Estimate. _____

$$\begin{array}{r} 30\text{ r}20 \\ 41\overline{)1{,}250} \\ -\ \square\square \\ \hline \square\square \\ -\ \square\square \\ \hline \square\square \end{array}$$

CHECK YOUR WORK

$$\begin{array}{r} 30 \\ \times 41 \\ \hline 30 \\ +\ 1{,}200 \\ \hline \square\square\square\square \end{array} \qquad \begin{array}{r} \square\square\square\square \\ +\ \square\square\square\square \\ \hline 1{,}250\ \checkmark \end{array}$$

So, Mr. Yates can buy _____ boxes of Valencia oranges.

Try This! **Divide. Check your answer.**

A

$63\overline{)756}$

B

$22\overline{)4{,}692}$

Name _____

Share and Show

Divide. Check your answer.

1. $28\overline{)620}$

2. $64\overline{)842}$

3. $53\overline{)2{,}340}$

4. $723 \div 31$

5. $1{,}359 \div 45$

6. $7{,}925 \div 72$

MATHEMATICAL PRACTICES

Math Talk **Explain** why you can use multiplication to check division.

On Your Own

Divide. Check your answer.

7. $16\overline{)346}$

8. $34\overline{)421}$

9. $77\overline{)851}$

10. $21\overline{)1{,}098}$

11. $32\overline{)6{,}466}$

12. $45\overline{)9{,}500}$

13. $483 \div 21$

14. $2{,}292 \div 19$

15. $4{,}255 \div 30$

Practice: Copy and Solve **Divide. Check your answer.**

16. $775 \div 35$

17. $820 \div 41$

18. $805 \div 24$

19. $1{,}166 \div 53$

20. $1{,}989 \div 15$

21. $3{,}927 \div 35$

Problem Solving REAL WORLD

Use the list at the right to solve 22–24.

22. A smoothie shop receives a delivery of 980 ounces of grape juice. How many Royal Purple smoothies can be made with the grape juice?

23. The shop has 1,260 ounces of cranberry juice and 650 ounces of passion fruit juice. If the juices are used to make Crazy Cranberry smoothies, which juice will run out first? How much of the other juice will be left over?

24. H.O.T. In the refrigerator, there are 680 ounces of orange juice and 410 ounces of mango juice. How many Orange Tango smoothies can be made? **Explain** your reasoning.

SHOW YOUR WORK

25. Test Prep James has 870 action figures. He decides to divide them equally among 23 boxes. How many action figures will James have left over?

Ⓐ 19 Ⓒ 31

Ⓑ 23 Ⓓ 37

FOR MORE PRACTICE:
Standards Practice Book, pp. P41–P42

Name _____

Interpret the Remainder

Essential Question When solving a division problem, when do you write the remainder as a fraction?

UNLOCK the Problem REAL WORLD

Scott and his family want to hike a trail that is 1,365 miles long. They will hike equal parts of the trail on 12 different hiking trips. How many miles will Scott's family hike on each trip?

- Circle the dividend you will use to solve the division problem.
- Underline the divisor you will use to solve the division problem.

When you solve a division problem with a remainder, the way you interpret the remainder depends on the situation and the question. Sometimes you need to use both the quotient and the remainder. You can do that by writing the remainder as a fraction.

One Way Write the remainder as a fraction.

First, divide to find the quotient and remainder.

Then, decide how to use the quotient and remainder to answer the question.

$12\overline{)1,365}$

- The _____ represents the number of trips Scott and his family plan to take.
- The _____ represents the whole-number part of the number of miles Scott and his family will hike on each trip.
- The _____ represents the number of miles left over.
- The remainder represents 9 miles, which can also be divided into 12 parts and written as a fraction.

$$\frac{\text{remainder}}{\text{divisor}} \rightarrow \_\_\_\_\_$$

- Write the quotient with the remainder written as a fraction in simplest form.

_____

So, Scott and his family will hike _____ miles on each trip.

Another Way Use only the quotient.

The segment of the Appalachian Trail that runs through Pennsylvania is 232 miles long. Scott and his family want to hike 9 miles each day on the trail. How many days will they hike exactly 9 miles?

$9\overline{)232}$

- Divide to find the quotient and the remainder.
- Since the remainder shows that there are not enough miles left for another 9-mile day, it is not used in the answer.

So, they will hike exactly 9 miles on each of _____ days.

Other Ways

A **Add 1 to the quotient.**

What is the total number of days that Scott will need to hike 232 miles?

- To hike the 7 remaining miles, he will need 1 more day.

So, Scott will need _____ days to hike 232 miles.

B **Use the remainder as the answer.**

If Scott hikes 9 miles each day except the last day, how many miles will he hike on the last day?

- The remainder is 7.

So, Scott will hike _____ miles on the last day.

Try This!

A sporting goods store is going to ship 1,252 sleeping bags. Each shipping carton can hold 8 sleeping bags. How many cartons are needed to ship all of the sleeping bags?

$$\begin{array}{r} 1\square \\ 8\overline{)1{,}252} \\ -\,8 \\ \hline 45 \\ -\,\square \\ \hline \square 2 \\ -\,\square \\ \hline \square \end{array}$$

Since there are _____ sleeping bags left over,

_____ cartons will be needed for all of the sleeping bags.

MATHEMATICAL PRACTICES

Math Talk **Explain** why you would not write the remainder as a fraction when you find the number of cartons needed in the Try This.

Name _____

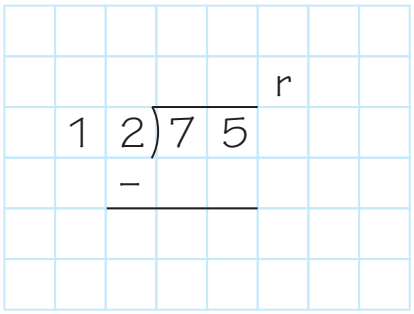
Share and Show

Interpret the remainder to solve.

1. Erika and Bradley want to hike the Big Cypress Trail. They will hike a total of 75 miles. If Erika and Bradley plan to hike for 12 days, how many miles will they hike each day?

   a. Divide to find the quotient and remainder.

   b. Decide how to use the quotient and remainder to answer the question.



2. **What if** Erika and Bradley want to hike 14 miles each day? How many days will they hike exactly 14 miles?

3. Dylan's hiking club is planning to stay overnight at a camping lodge. Each large room can hold 15 hikers. There are 154 hikers. How many rooms will they need?

On Your Own

Interpret the remainder to solve.

4. The students in a class of 24 share 84 cookies equally among them. How many cookies did each student eat?

5. A campground has cabins that can each hold 28 campers. There are 148 campers visiting the campground. How many cabins are full if 28 campers are in each cabin?

6. A total of 123 fifth-grade students are going to Fort Verde State Historic Park. Each bus holds 38 students. All of the buses are full except one. How many students will be in the bus that is not full?

7. H.O.T. **What's the Error?** Sheila is going to divide a 36-inch piece of ribbon into 5 equal pieces. She says each piece will be 7 inches long.

UNLOCK the Problem REAL WORLD

8. Maureen has 243 ounces of trail mix. She puts an equal number of ounces in each of 15 bags. How many ounces of trail mix does Maureen have left over?

Ⓐ 3 ounces Ⓑ 15 ounces Ⓒ 16 ounces Ⓓ 17 ounces

a. What do you need to find? _____

_____

b. How will you use division to find how many ounces of trail mix are left over?

_____

_____

c. Show the steps you use to solve the problem.

d. Complete the sentences.

Maureen has _____ ounces of trail mix.

She puts an equal number in each of _____ bags.

Each bag has _____ ounces.

Maureen has _____ ounces of trail mix left over.

e. Fill in the bubble completely to show your answer.

9. Mr. Field wants to give each of his 72 campers a certificate for completing an obstacle course. If there are 16 certificates in one package, how many packages will Mr. Field need?

Ⓐ 4 Ⓒ 16

Ⓑ 5 Ⓓ 17

10. James has 884 feet of rope. There are 12 teams of hikers. If James gives an equal amount of rope to each team, how much rope will each team receive?

Ⓐ 12 feet Ⓒ $73\frac{2}{3}$ feet

Ⓑ 73 feet Ⓓ 74 feet

FOR MORE PRACTICE:
Standards Practice Book, pp. P43–P44

Name _____

Adjust Quotients

Essential Question How can you adjust the quotient if your estimate is too high or too low?

CONNECT When you estimate to decide where to place the first digit, you can also try using the first digit of your estimate to find the first digit of your quotient. Sometimes an estimate is too low or too high.

Divide. 3,382 ÷ 48

Estimate. 3,000 ÷ 50 = 60

Try 6 tens.

If an estimate is too low, the difference will be greater than the divisor.

$$\begin{array}{r} 6 \\ 48\overline{)3{,}382} \\ -2\,88 \\ \hline 50 \end{array}$$

Since the estimate is too low, adjust by increasing the number in the quotient.

Divide. 453 ÷ 65

Estimate. 490 ÷ 70 = 7

Try 7 ones.

If an estimate is too high, the product with the first digit will be too large and cannot be subtracted.

$$\begin{array}{r} 7 \\ 65\overline{)453} \\ -455 \\ \hline \end{array}$$

Since the estimate is too high, adjust by decreasing the number in the quotient.

UNLOCK the Problem REAL WORLD

A new music group makes 6,127 copies of its first CD. The group sells 75 copies of the CD at each of its shows. How many shows does it take the group to sell all of the CDs?

Divide. 6,127 ÷ 75 **Estimate.** 6,300 ÷ 70 = 90

STEP 1 Use the estimate, 90. Try 9 tens.

- Is the estimate too high, too low, or correct?

_____

- Adjust the number in the quotient if needed.

STEP 2 Estimate the next digit in the quotient.
Divide the ones.
Estimate: 140 ÷ 70 = 2. Try 2 ones.

- Is the estimate too high, too low, or correct?

_____

- Adjust the number in the quotient if needed.

$75\overline{)6{,}127}$

So, it takes the group _____ shows to sell all of the CDs.

Try This! When the difference is equal to or greater than the divisor, the estimate is too low.

Divide. 336 ÷ 48 **Estimate.** 300 ÷ 50 = 6

Use the estimate.

Try 6 ones.

$$48\overline{)336}\quad 6$$

Since _____, the estimate is _____.

336 ÷ 48 = _____

Adjust the estimated digit in the quotient if needed. Then divide.

Try _____.

MATHEMATICAL PRACTICES

Math Talk **Explain** why using the closest estimate could be useful in solving a division problem.

Share and Show

MATH BOARD

Adjust the estimated digit in the quotient, if needed. Then divide.

1. $41\overline{)1{,}546}\quad 4$

2. $16\overline{)416}\quad 2$

3. $34\overline{)2{,}831}\quad 9$

Divide.

4. $19\overline{)915}$

5. $28\overline{)1{,}825}$

6. $45\overline{)3{,}518}$

MATHEMATICAL PRACTICES

Math Talk **Explain** how you know whether an estimated quotient is too low or too high.

Name _____

On Your Own

Adjust the estimated digit in the quotient, if needed. Then divide.

7. $26\overline{)541}$ (estimate: 2)

8. $43\overline{)688}$ (estimate: 1)

9. $67\overline{)4{,}873}$ (estimate: 6)

Divide.

10. $15\overline{)975}$

11. $37\overline{)264}$

12. $22\overline{)6{,}837}$

Practice: Copy and Solve Divide.

13. $452 \div 31$

14. $592 \div 74$

15. $785 \div 14$

16. $601 \div 66$

17. $1{,}067 \div 97$

18. $2{,}693 \div 56$

19. $1{,}488 \div 78$

20. $2{,}230 \div 42$

21. $4{,}295 \div 66$

H.O.T. **Algebra** Write the unknown number for each ▢.

22. ▢ $\div 33 = 11$

▢ = _____

23. $1{,}092 \div 52 =$ ▢

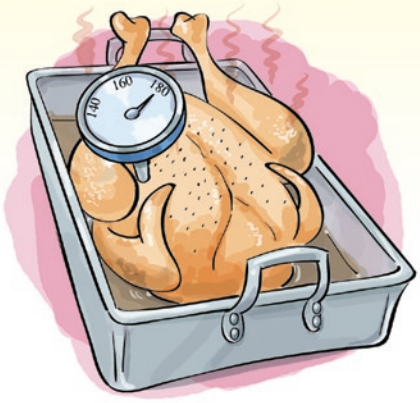
▢ = _____

24. $429 \div$ ▢ $= 33$

▢ = _____

UNLOCK the Problem REAL WORLD

25. A banquet hall serves 2,394 pounds of turkey during a 3-week period. If the same amount is served each day, how many pounds of turkey does the banquet hall serve each day?



Ⓐ 50,274 pounds

Ⓑ 798 pounds

Ⓒ 342 pounds

Ⓓ 114 pounds

a. What do you need to find? _____

_____

b. What information are you given? _____

_____

c. What other information will you use?

_____

_____

_____

d. Find how many days there are in 3 weeks.

There are _____ days in 3 weeks.

e. Divide to solve the problem.

f. Fill in the bubble for the correct answer choice.

26. Marcos mixes 624 ounces of lemonade. He wants to fill the 52 cups he has with equal amounts of lemonade. How much lemonade should he put in each cup?

Ⓐ 8 ounces

Ⓑ 12 ounces

Ⓒ 18 ounces

Ⓓ 20 ounces

27. The Box of Sox company packs 18 pairs of socks in a box. How many boxes will the company need to pack 810 pairs of socks?

Ⓐ 40

Ⓑ 45

Ⓒ 55

Ⓓ 56

FOR MORE PRACTICE:
Standards Practice Book, pp. P45–P46

Name _____

Problem Solving • Division

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

UNLOCK the Problem REAL WORLD

Sean and his family chartered a fishing boat for the day. Sean caught a blue marlin and an amberjack. The weight of the blue marlin was 12 times as great as the weight of the amberjack. The combined weight of both fish was 273 pounds. How much did each fish weigh?

Read the Problem

What do I need to find?

I need to find _____

_____.

What information do I need to use?

I need to know that Sean caught a total of _____ pounds of fish and the weight of the blue marlin was _____ times as great as the weight of the amberjack.

How will I use the information?

I can use the strategy _____ and then divide. I can draw and use a bar model to write the division problem that helps me find the weight of each fish.

Solve the Problem

I will draw one box to show the weight of the amberjack. Then I will draw a bar of 12 boxes of the same size to show the weight of the blue marlin. I can divide the total weight of the two fish by the total number of boxes.

amberjack ___

blue marlin ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___

273 pounds

Write the quotient in each box. Multiply it by 12 to find the weight of the blue marlin.

$$\begin{array}{r} 2 \\ 13\overline{)273} \\ -26 \\ \hline \\ - \\ \hline \end{array}$$

So, the amberjack weighed _____ pounds and the blue marlin weighed _____ pounds.

Try Another Problem

Jason, Murray, and Dana went fishing. Dana caught a red snapper. Jason caught a tuna with a weight 3 times as great as the weight of the red snapper. Murray caught a sailfish with a weight 12 times as great as the weight of the red snapper. If the combined weight of the three fish was 208 pounds, how much did the tuna weigh?

Read the Problem

What do I need to find?	What information do I need to use?	How will I use the information?

Solve the Problem

So, the tuna weighed _____ pounds.

- How can you check if your answer is correct? _____

_____

MATHEMATICAL PRACTICES

Math Talk **Explain** how you could use another strategy to solve this problem.

Name _____

Share and Show

MATH BOARD

Choose a STRATEGY

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

1. Paula caught a tarpon with a weight that was 10 times as great as the weight of a permit fish she caught. The total weight of the two fish was 132 pounds. How much did each fish weigh?

   First, draw one box to represent the weight of the permit fish and ten boxes to represent the weight of the tarpon.

   Next, divide the total weight of the two fish by the total number of boxes you drew. Place the quotient in each box.

   Last, find the weight of each fish.

   The permit fish weighed _____ pounds.

   The tarpon weighed _____ pounds.

SHOW YOUR WORK

2. **What if** the weight of the tarpon was 11 times the weight of the permit fish, and the total weight of the two fish was 132 pounds? How much would each fish weigh?

   permit fish: _____ pounds

   tarpon: _____ pounds

3. Jon caught four fish that weighed a total of 252 pounds. The kingfish weighed twice as much as the amberjack and the white marlin weighed twice as much as the kingfish. The weight of the tarpon was 5 times the weight of the amberjack. How much did each fish weigh?

   amberjack: _____ pounds

   kingfish: _____ pounds

   marlin: _____ pounds

   tarpon: _____ pounds

On Your Own

Use the table to solve 4–7.

Kevin's Supply List for a Saltwater Aquarium	
40-gal tank	$170
Aquarium light	$30
Filtration system	$65
Thermometer	$2
15-lb bag of gravel	$13
Large rocks	$3 per lb
Clown fish	$20 each
Damselfish	$7 each

4. Kevin is starting a saltwater aquarium with 36 fish. He wants to start with 11 times as many damselfish as clown fish. How many of each fish will Kevin buy? How much will he pay for the fish?

5. Kevin used a store coupon to buy a 40-gallon tank, an aquarium light, and a filtration system. He paid a total of $240. How much money did Kevin save by using the coupon?

6. H.O.T. Kevin bought 3 bags of gravel to cover the bottom of his fish tank. He has 8 pounds of gravel left over. How much gravel did Kevin use to cover the bottom of the tank?

7. Write Math **Pose a Problem** Look back at Problem 6. Write a similar problem by changing the number of bags of gravel and the amount of gravel left.

8. **Test Prep** Captain James offers a deep-sea fishing tour. He charges $2,940 for a 14-hour trip. How much does each hour of the tour cost?

Ⓐ $138 Ⓒ $210

Ⓑ $201 Ⓓ $294

FOR MORE PRACTICE:
Standards Practice Book, pp. P47–P48

Name _____

Chapter Review/Test

Vocabulary

Choose the best term from the box.

Vocabulary
compatible numbers
partial quotients
place value

1. You can use _____ to estimate quotients because they are easy to compute with mentally. (p. 79)
2. To decide where to place the first digit in the quotient, you can estimate or use _____. (p. 61)

Concepts and Skills

Use compatible numbers to estimate the quotient.

3. $522 \div 6$ _____
4. $1{,}285 \div 32$ _____
5. $6{,}285 \div 89$ _____

Divide. Check your answer.

6. $2\overline{)554}$
7. $8\overline{)680}$
8. $5\overline{)462}$
9. $522 \div 18$
10. $529 \div 37$
11. $987 \div 15$
12. $1{,}248 \div 24$
13. $5{,}210 \div 17$
14. $8{,}808 \div 42$

GO Online Assessment Options Chapter Test

Fill in the bubble completely to show your answer.

15. Samira bought 156 ounces of trail mix. She wants to divide the amount equally into 24 portions. How many ounces of trail mix will be in each portion?

Ⓐ 6 ounces
Ⓑ $6\frac{1}{2}$ ounces
Ⓒ 7 ounces
Ⓓ 12 ounces

16. A school band performed 6 concerts. Every seat for each performance was sold. If a total of 1,248 seats were sold for all 6 concerts, how many seats were sold for each performance?

Ⓐ 28
Ⓑ 200
Ⓒ 206
Ⓓ 208

17. Dylan's dog weighs 12 times as much as his pet rabbit. The dog and rabbit weigh 104 pounds altogether. How much does Dylan's dog weigh?

Ⓐ 104 pounds
Ⓑ 96 pounds
Ⓒ 88 pounds
Ⓓ 8 pounds

18. Jamie is sewing 14 identical costumes for the school play. She needs 210 buttons to complete all of the costumes. How many buttons will she sew onto each costume?

Ⓐ 15
Ⓑ 14
Ⓒ 11
Ⓓ 9

Name _____

Fill in the bubble completely to show your answer.

19. A book publishing company is shipping an order of 300 books. The books are packaged in boxes that each can hold 24 books. How many boxes are needed to ship the order of books?

(A) 10

(B) 11

(C) 12

(D) 13

20. Richard is planning a trip to Italy. He thinks he will need $2,750 for the trip. If the trip is 40 weeks away, which is the best estimate of how much money Richard needs to save each week?

(A) $60

(B) $70

(C) $600

(D) $700

21. A school club raises $506 to spend on a field trip. There are 23 people going on the trip. How much money did the club raise for each person going?

(A) $27

(B) $22

(C) $18

(D) $12

22. A local orange grower processes 2,330 oranges from his grove this year. The oranges are packaged in crates that each hold 96 oranges. All but one crate is full. How many oranges are in this last crate?

(A) 24

(B) 25

(C) 26

(D) 27

Constructed Response

23. On Monday, 1,900 bottles of perfume are delivered to a warehouse. The bottles are packed in boxes. Each box can hold 32 bottles. How many boxes were delivered? **Explain** how you found your answer.

Performance Task

24. Quincy needs 322 yards of ribbon to decorate quilts for a craft fair. The ribbon comes in rolls of 15 yards.

A How many rolls of ribbon should Quincy buy? **Explain** your answer.

B Alice needs twice as many yards of ribbon as Quincy. How many rolls of ribbon does Alice need? **Explain** your answer.

C Elena needs yellow, red, and blue ribbon. She needs 285 yards of the three colors combined. Suggest numbers of rolls of each color that would give her enough ribbon. (HINT: Break apart the 285 yards into any combination of 3 groups that total this amount.)