8. Brandon calculated $63 \div 9$ by recalling that $45 \div 9 = 5$ and then skip counting forward by 9s to 63.

Use a strategy like Brandon’s to calculate each quotient.

- $45 \div 9 = 5$
- $63 \div 9 = 5 + 2$

a) $28 \div 7$

Choose any multiple of 7 that is less than 28, for example, 14.

- $+7 +7$

Divide: $14 \div 7 = 2$

2 groups of 7 + 2 more groups of 7 is 4 groups of 7.

So $28 \div 7 =$

b) $42 \div 6$

Choose any multiple of 6 that is less than 42, for example, 24.

- $+6 +6 +6$

Divide: $24 \div 6 = 4$

4 groups of 6 + 3 more groups of 6 is ____ groups of 6.

So $42 \div 6 =$

c) $32 \div 4 =$

d) $32 \div 8 =$
Division Fact Strategies

GOAL
Use strategies to relate unknown facts to known facts.

1. Use the array to complete each equation.
   a) $15 \div 5 = \underline{3}$
   b) $25 \div 5 = \underline{5}$

2. Sketch an array to determine each quotient.
   a) $12 \div 3 = \underline{4}$
   b) $24 \div 4 = \underline{6}$
   d) $40 \div 5 = \underline{8}$
   c) $21 \div 3 = \underline{7}$
   e) $42 \div 6 = \underline{7}$
9.1 Division Fact Strategies  Page 1

Student Book pages 298–301

Use strategies to relate unknown facts to known facts.

Desmond has a deck of 48 playing cards.
There were no instructions for playing, so Desmond invented his own game.
Here are 2 of his rules:
• All players start with the same number of cards.
• There must be fewer than 10 players, and each player must have less than 10 cards.

How many players can play Desmond’s game using all 48 cards, with no leftover cards?

A. Suppose there are 6 players.

Share 48 counters between 6 groups.
Place an equal number of counters in each group.
Hint: Place 1 counter in each group, and then repeat this step until you have used all the counters.

How many counters are in each group? _______
How many cards will each player have? _______

B. Desmond created an array of playing cards.
The columns show the number of players.
There are ______ columns.
The rows show the number of cards.
There are ______ rows.
9.1 Division Fact Strategies  Page 2

C. What 2 multiplication facts does the array show?
   Fact #1: number of rows × number of columns = ______ × ______
   Fact #2: number of columns × number of rows = ______ × ______

D. What 2 division facts does the array show?
   Fact #1: 48 ÷ number of columns = 48 ÷ ______
   Fact #2: 48 ÷ number of rows = 48 ÷ ______

E. Skip count by 5s.


   Why can’t there be 5 players?

   ____________________________
   ____________________________
   ____________________________
   ____________________________
   ____________________________
   ____________________________
   ____________________________
   ____________________________
   ____________________________

F. Could there be any other number of players (less than 10) with no leftover cards?
   Hint: Think of all the ways to multiply 2 numbers to make 48.

   ____________________________
   ____________________________
   ____________________________
   ____________________________
   ____________________________
   ____________________________
   ____________________________
   ____________________________
   ____________________________
   ____________________________

Reflecting

   Why is creating an array a useful way to figure out a division fact?

   ____________________________
   ____________________________
   ____________________________
   ____________________________
   ____________________________
   ____________________________
   ____________________________
9.1 Division Fact Strategies  Page 1

Student Book pages 298–301

Checking

1. Suppose Desmond's game used 36 cards instead of 48 cards.
   His rules remain the same:
   • All players start with the same number of cards.
   • There must be fewer than 10 players, and each player must have less than 10 cards.
   How many players could play his game?

   a) Arrange the counters into an array. Write the multiplication sentence.
      
      ______ × _______
      
      How many players can play the game? ______

   b) Arrange the counters into a different array. Write the multiplication sentence.
      
      ______ × _______
      
      How many players can play the game? ______

   c) How many other players can play Desmond's game?

Practising

3. Sketch an array to complete the division equation.

   a) \(18 \div 2 = \)

      Use 18 counters to make 2 equal rows. Sketch the array below.

      How many counters are in each row? ______
      
      \(18 \div 2 = ______\)
9.1 Division Fact Strategies  Page 2

b) \(49 \div 7 = \) 
Use 49 counters to make 7 equal rows. Sketch the array below.

How many counters are in each row? ______

\(49 \div 7 = \) ______

c) \(24 \div 4 = \) 
Use ______ counters to make 4 equal rows. Sketch the array below.

\(24 \div 4 = \) ______

d) \(42 \div 6 = \) 
Use ______ counters to make ______ equal rows.

\(42 \div 6 = \) ______

e) \(35 \div 7 = \) 
Use counters to show this equation.

\(35 \div 7 = \) ______

f) \(56 \div 8 = \) 
Use counters to show this equation.

\(56 \div 8 = \) ______
8 vans are taking 56 students to Pioneer Village Museum. Each van holds an equal number of students.

How many students should go in each van?

Step 1: Divide 56 counters into 2 equal groups.

Hint: Draw 2 circles, and place an equal number of counters in each circle.

How many counters are in each group? ______

56 ÷ 2 = ______

Step 2: Divide the 2 groups in Step 1 into 2 equal groups.

There are 2 × 2 = 4 equal groups.

Divide ______ counters into 2 equal groups.

How many counters are in each group? ______

_______ ÷ 2 = ______

Step 3: Divide the 4 groups in Step 2 into 2 equal groups.

There are 4 × 2 = ______ equal groups.

Divide ______ counters into ______ equal groups.

How many counters are in each group? ______

_______ ÷ 2 = ______

There are ______ groups with ______ counters in each group.

So, ______ students should go in each van.
Reflecting
What is another way of calculating $56 \div 2 = 28$? 

What is another way of calculating $28 \div 2 = 14$? 

You know that $8 = 2 \times 2 \times 2$. How does this help you to calculate $56 \div 8$? 

How can you use dividing by halving to calculate $36 \div 4$?
Checking

1. 4 vans are taking 24 students on a field trip.
   Each van has the same number of students.
   Divide by 2 to find how many students are in each van.
   Dividing by 4 is the same as dividing by 2 ________ times.
   Share 24 counters between 2 equal groups.
   How many counters are in each group? ________
   $24 ÷ 2 = ________$
   Share each of those groups between 2 groups. You should have 4 equal groups.
   How many counters are in each group? ________
   $24 ÷ 4 = ________$
   There will be ________ students in each van.

Practising

2. Calculate each quotient by dividing by 2 as many times as necessary.

a) $64 ÷ 8$
   $8 = 2 \times 2 \times ________$
   Dividing by 8 is the same as dividing by 2 ________ times.
   Share 64 counters between 2 equal groups.
   How many counters are in each group? ________
   $64 ÷ 2 = ________$
   Share each of those groups between 2 groups. You should have 4 equal groups.
   How many counters are in each group? ________
   ________ $\div 2 = ________$
   Share each of those groups between 2 groups. You should have 8 equal groups.
   How many counters are in each group? ________
   ________ $\div 2 = ________$
   So, $64 ÷ 8 = ________$. 
9.2 Dividing by Halving  Page 2

b) \(32 \div 4\)

\[ 8 = 2 \times \underline{\phantom{000}} \]

Dividing by 4 is the same as dividing by 2 ______ times.

Share 32 counters between 2 equal groups.

\[ 32 \div 2 = \underline{\phantom{000}} \]

Share each of those groups between 2 groups. You should have 4 equal groups.

\[ \underline{\phantom{000}} \div 2 = \underline{\phantom{000}} \]

So, \(32 \div 4 = \underline{\phantom{000}}\).

c) \(72 \div 8\)

\[ 8 = 2 \times \underline{\phantom{000}} \times \underline{\phantom{000}} \]

Dividing by 8 is the same as dividing by 2 ______ times.

Share 72 counters between 2 equal groups.

\[ 72 \div 2 = \underline{\phantom{000}} \]

Share each of those groups between 2 groups. You should have 4 equal groups.

\[ \underline{\phantom{000}} \div 2 = \underline{\phantom{000}} \]

Share each of those groups between 2 groups. You should have 8 equal groups.

\[ \underline{\phantom{000}} \div 2 = \underline{\phantom{000}} \]

So, \(72 \div 8 = \underline{\phantom{000}}\).

d) \(48 \div 8\)

\[ 8 = \underline{\phantom{000}} \times \underline{\phantom{000}} \times \underline{\phantom{000}} \]

Dividing by 8 is the same as dividing by 2 ______ times.

Share 48 counters between 2 equal groups.

\[ 48 \div 2 = \underline{\phantom{000}} \]

Share each of those groups between 2 groups. You should have 4 equal groups.

\[ \underline{\phantom{000}} \div 2 = \underline{\phantom{000}} \]

Share each of those groups between 2 groups. You should have 8 equal groups.

\[ \underline{\phantom{000}} \div 2 = \underline{\phantom{000}} \]

So, \(48 \div 8 = \underline{\phantom{000}}\).
**Dividing by Halving**

**GOAL**

Relate division facts by halving.

1. 20 people are sitting in 4 equal groups. How many people are in each group? Use dividing by 2 to calculate the number of people in each group.

2. Jolie brought 72 cookies to class. She has 8 bags of cookies with the same number in each bag. How many cookies are in each bag?

3. Calculate each quotient by dividing by 2 as many times as necessary. Show your work.
   - a) \(24 \div 4 = \)  
   - b) \(64 \div 8 = \)  
   - c) \(40 \div 4 = \)
Dividing by 2 Is Easy to Do

When dividing by 2, you are really just dividing a number in half. This is because you are putting the dividend into 2 groups.

Find the quotient for each problem. Use pictures if you need to.

1. 6 pencils ÷ 2 = __________
2. 4 flowers ÷ 2 = __________
3. 10 phones ÷ 2 = __________
4. 16 forks ÷ 2 = __________
5. 2 stars ÷ 2 = __________
6. 12 fish ÷ 2 = __________
7. 14 oranges ÷ 2 = __________
8. 8 candies ÷ 2 = __________
9. 18 bowling pins ÷ 2 = __________
10. 20 spiders ÷ 2 = __________

Find the quotient. The divisor is 2 in all the problems.

24 ÷ 2 = __________
2 ÷ 2 = __________
8 ÷ 2 = __________
14 ÷ 2 = __________
6 ÷ 2 = __________
18 ÷ 2 = __________

2) 10 = __________
2) 20 = __________
2) 12 = __________
2) 4 = __________
2) 14 = __________
2) 18 = __________
### Find Prime Numbers

A prime number has only two different factors, itself and 1. A composite number has more than two factors.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
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<th>10</th>
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<td>97</td>
<td>98</td>
<td>99</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

1. Cross out 1. It has only 1 factor. It is neither prime nor composite.
2. Circle 2. Then, cross out all the numbers divisible by 2.
3. Go to the next number that is not circled or crossed out and circle it. Then, cross out all the numbers divisible by that number.
4. Repeat step 3 until you find all the prime numbers less than 100.
5. How many prime numbers did you find? __________
6. What is the least prime number? ______  Greatest prime number? ______
7. List the prime numbers less than 30.
   ____________________________
8. List the prime numbers between 30 and 100.
   ____________________________
### Divisibility Rules

<table>
<thead>
<tr>
<th>Number</th>
<th>Divisible by</th>
</tr>
</thead>
<tbody>
<tr>
<td>even; ends in 0, 2, 4, 6, 8</td>
<td>2</td>
</tr>
<tr>
<td>ends in 0 or 5</td>
<td>5</td>
</tr>
<tr>
<td>ends in 0</td>
<td>10</td>
</tr>
<tr>
<td>sum of the digits is divisible by 3</td>
<td>3</td>
</tr>
<tr>
<td>divisible by 2 and 3</td>
<td>6</td>
</tr>
</tbody>
</table>

Note: 1 is a factor of every number.
If a number is divisible by 2, then 2 is a factor of that number.

What are the factors of 36? It's even, so, it's divisible by 2. The sum of its digits is divisible by 3. Since it's divisible by 2 and 3, it's divisible by 6.

The factors of 36 are 1, 2, 3, 4, 6, 9, 12, 18, 36, 1 and 36, 2 and 18, 3 and 12, 4 and 9, 6 and 6 are factor pairs.

Tell whether each number is divisible by 2, 3, 5, 6, or 10.

<table>
<thead>
<tr>
<th></th>
<th>Divisible by</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>20, 2, 5, 10</td>
</tr>
<tr>
<td>2</td>
<td>42</td>
</tr>
<tr>
<td>3</td>
<td>38</td>
</tr>
<tr>
<td>4</td>
<td>64</td>
</tr>
<tr>
<td>5</td>
<td>27</td>
</tr>
<tr>
<td>6</td>
<td>56</td>
</tr>
<tr>
<td>7</td>
<td>70</td>
</tr>
<tr>
<td>8</td>
<td>90</td>
</tr>
</tbody>
</table>

List the factors for each number in order. Think of factor pairs.

<table>
<thead>
<tr>
<th></th>
<th>Divisible by</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>21, 1, 30</td>
</tr>
<tr>
<td>6</td>
<td>56, 1, 42</td>
</tr>
<tr>
<td>7</td>
<td>64, 1, 80</td>
</tr>
<tr>
<td>8</td>
<td>96, 1, 100</td>
</tr>
</tbody>
</table>
9.3 Dividing Tens and Hundreds  Page 1
Student Book pages 304–306

GOAL
Divide tens and hundreds by one-digit numbers.

A casserole has 6 layers of filling.
The recipe card shows some of the ingredients.

How many grams of each ingredient are in each layer of filling?

Step 1: There are 6 layers of filling.
Divide the number of grams of each ingredient by 6.

Step 2: Use base ten blocks to model 240 g of rabbit.

240 = 2 hundreds blocks + 4 tens blocks

Each hundreds block is 10 tens blocks.

240 = 10 tens blocks + 10 tens blocks + 4 tens blocks = 24 tens blocks

So, 240 is the same as 24 tens.

Step 3: Divide 24 tens into 6 equal groups.

24 ÷ 6 = 4

There are 6 groups of 4 tens in each group.

4 tens = 40

So, there are 40 g of rabbit in each layer.
9.3 Dividing Tens and Hundreds  Page 2

Step 4: Use base ten blocks to model 360 g of turkey.

Hint: 360 is 3 hundreds + 6 tens, or 3 tens + 3 tens + 3 tens + 6 tens, or 36 tens.

36 tens ÷ 6 = _______ tens

_______ tens = _______

There are ________ g of turkey in each layer.

Step 5: Use base ten blocks to model 180 g of pork.

180 = _______ tens

_______ tens ÷ 6 = _______ tens

_______ tens = _______

There are ________ g of pork in each layer.

Step 6: Use base ten blocks to model 300 g of venison.

300 = _______ tens

_______ tens ÷ 6 = _______ tens

_______ tens = _______

There are ________ g of venison in each layer.

Reflecting

The recipe also requires 660 g of cubed potatoes.

Why might you write 660 as 66 tens to divide by 6?

Hint: Use base ten blocks to model 660.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

How can you use 30 ÷ 6 to calculate 300 ÷ 6?

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
9.3 Dividing Tens and Hundreds  Page 1
Student Book pages 304–306

Checking

1. The 350 students in Aaron's school were placed in groups of 5 for an activity. How many groups were there?
   \[350 \div 5 = \Box\]
   Use base ten blocks to model 350.
   \[350 = \underline{\Box} \text{ tens}\]
   \[\underline{\Box} \text{ tens} \div 5 = \underline{\Box} \text{ tens}\]
   \[\underline{\Box} \text{ tens} = \underline{\Box}\]
   There were \underline{\Box} groups.

2. Calculate. Use base ten blocks to model each question.

   a) \[240 \div 8 = \Box\]
      \[240 = \underline{\Box} \text{ tens}\]
      \[\underline{\Box} \text{ tens} \div 8 = \underline{\Box} \text{ tens}\]
      \[\underline{\Box} \text{ tens} = \underline{\Box}\]
      \[240 \div 8 = \underline{\Box}\]

   b) \[\Box = 800 \div 4\]
      \[800 = \underline{\Box} \text{ hundreds}\]
      \[\underline{\Box} \text{ hundreds} \div 4 = \underline{\Box} \text{ hundreds}\]
      \[\underline{\Box} \text{ hundreds} = \underline{\Box}\]
      \[800 \div 4 = \underline{\Box}\]
9.3 Dividing Tens and Hundreds

\[
\text{c) } 560 \div 7 = \underline{8} \\
560 = \underline{56} \text{ tens} \\
\underline{56} \text{ tens} \div 7 = \underline{8} \text{ tens} \\
\underline{8} \text{ tens} = \underline{0} \\
560 \div 7 = \underline{0} \\
\]

\[
\text{d) } \underline{81} \div 9 \\
810 = \underline{81} \text{ tens} \\
\underline{81} \text{ tens} \div 9 = \underline{9} \text{ tens} \\
\underline{9} \text{ tens} = \underline{0} \\
810 \div 9 = \underline{0} \\
\]

Practising

6. Draw a picture to show how calculating \(280 \div 7\) is related to calculating \(28 \div 7\). Explain your picture.
   Use base ten blocks to model 280.
   How many tens are there? \(\underline{2}\)
   Draw a picture to show \(28 \div 7\).
   Hint: Use base ten blocks in your picture.

\[
28 \div 7 = \underline{4} \text{ tens} \\
\underline{4} \text{ tens} = \underline{0} \\
\]
Dividing Tens and Hundreds

**GOAL**
Divide tens and hundreds by one-digit numbers.

1. Rename, and then calculate. Show your work.
   a) \(400 \div 2 = \) 
   
   b) \(600 \div 2 = \) 
   
   c) \(120 \div 6 = \) 

2. Calculate.
   a) \(240 \div 4 = \) 
   c) \(150 \div 3 = \) 
   e) \(\) \(= 900 \div 3\)
   b) \(360 \div 9 = \) 
   d) \(480 \div 8 = \) 
   f) \(\) \(= 270 \div 9\)

3. Tai sketched base ten blocks to calculate \(140 \div 7\). Explain how Tai can calculate the quotient.

4. Sketch base ten blocks to show how calculating \(800 \div 4\) is like calculating \(8 \div 4\). Explain your sketch.
Dividing Multiples of 10, 100 or 1000

Example

3 children share 600 stickers. How many stickers does each child get?

\[
600 \div 3 = 2 \text{ hundreds}
\]

Each child gets 200 stickers.

\[
\begin{array}{c|c}
\text{divisor} & \text{dividend} \\
3 & 600 \\
\hline
& 200 \quad \text{quotient} \\
\end{array}
\]

Fill in the missing numbers.

1. \[800 \div 2 = \underline{\phantom{0}} \text{ hundreds} \div 2 = \underline{\phantom{0}} \text{ hundreds} = \underline{\phantom{0}} \]
2. \[550 \div 5 = \underline{\phantom{0}} \text{ tens} \div 5 = \underline{\phantom{0}} \text{ tens} = \underline{\phantom{0}} \]
3. \[360 \div 9 = \underline{\phantom{0}} \text{ tens} \div 9 = \underline{\phantom{0}} \text{ tens} = \underline{\phantom{0}} \]
4. \[480 \div 8 = \underline{\phantom{0}} \text{ tens} \div 8 = \underline{\phantom{0}} \text{ tens} = \underline{\phantom{0}} \]
5. \[600 \div 6 = \underline{\phantom{0}} \text{ hundreds} \div 6 = \underline{\phantom{0}} \text{ hundred} = \underline{\phantom{0}} \]
6. \[240 \div 4 = \underline{\phantom{0}} \text{ tens} \div 4 = \underline{\phantom{0}} \text{ tens} = \underline{\phantom{0}} \]

- Dividing the multiples of 10, 100 or 1000 is similar to dividing other dividends, but don’t forget to write the zero(s) in the quotient.
  \[420 \div 7 = \]
  \[
  \begin{array}{c|c c c}
  \text{7} & 420 & 6 & 60 \\
  \hline
  7 & 420 & 42 & 420 \\
  \text{50} & 420 & 420 & 420 \\
  \end{array}
  \]

- Estimate the quotient by rounding the numbers to the nearest ten, hundred or thousand.
  \[621 \div 2 = ?
  \]
  \[\text{estimate} \quad 600 \div 2 = 300 \quad \text{the answer should be close to 300}
  \]
  There are about 300 twos in 621.
9.4 Estimating Quotients  Page 1

Student Book pages 309–310

GOAL
Use personal strategies to estimate quotients.

Some groups of animals have special names.
Some examples include:
• a pod of dolphins
• a mob of kangaroos
• a rookery of penguins

A mob of 114 kangaroos split into equal groups and hopped off in 4 different directions.

About how many kangaroos hopped off in each direction?

René's Strategy: Use base ten blocks to model the problem.

114 is about 120, and 120 = 12 tens.

Divide 12 tens into 4 equal groups.

12 tens ÷ 4 = _______ tens

_______ tens = _______

René's estimate is about _______ kangaroos.

(Circle) the correct answer. 120 is bigger than 114. 120 is smaller than 114.

(Circle) the correct answer, and then explain your reasoning.

René's estimate is high because René's estimate is low because
9.4 Estimating Quotients

Tai’s Strategy: Use counters to model the problem. 114 is close to 100. Divide 100 counters into 4 equal groups. How many counters are in each group? ______

100 ÷ 4 = ______

Tai’s estimate is about _______ kangaroos.

Circle the correct answer. 100 is bigger than 114. 100 is smaller than 114.

Circle the correct answer, and then explain your reasoning.

Tai’s estimate is high because Tai’s estimate is low because

______________________________

Complete the number line.

Identify 114 on the number line below.

114 is closest to _______ because

______________________________

Circle the correct answer.

Whose estimate is closest to the actual value? René’s Tai’s

About how many kangaroos hopped off in each direction? ______

Reflecting

René used 120 kangaroos to estimate. Tai used 100 kangaroos to estimate.

Why were both of these numbers good choices?

______________________________

______________________________

How are René’s and Tai’s estimation strategies the same? How are they different?

______________________________

______________________________
Checking

1. A rookery of 278 penguins was formed when 4 smaller rookeries came together.
The 4 groups were almost equal.

a) Place 278 on the number line below.

\[ \begin{array}{c}
270 \\
278 \\
280 \\
\end{array} \]

278 is about _______.
Why is this a good number to estimate 278 ÷ 4?

b) Use base ten blocks to model the number from part a).

_______ is _______ tens.
_______ tens ÷ 4 = _______ tens
_______ tens = _______
There are about _______ penguins in each smaller rookery.
Practising

2. A large pod of 132 dolphins was formed when 9 smaller pods came together. The smaller pods were almost equal.

Place 132 on a number line.

132 is about ________.

Use base ten blocks to model the number.

_______ is _______ tens.

Divide the tens blocks into 9 equal groups. Draw your groups in the space below.

About how many dolphins were in each smaller pod? _______

Explain how you determined your estimate.
Estimating Quotients

Estimate $3\div73$.

When you estimate you do not need an exact answer.

Use a smaller fact close to $3\div7$.

Divide.

$3\div73$ is a smaller fact close to $3\div7$.

Write 2 in the tens place. $2\div73$ Write zero to complete the estimate.

The estimate is 20.

Estimate.

1. $10 \div 68$.
   - $4\div4$ is close to $4\div6$.
   - Write ___ in the tens place.
   - Write ___ to complete the estimate.

2. $2\div57$.
   - ___ is close to $2\div5$.
   - Write ___ in the tens place.
   - Write ___ to complete the estimate.

3. $3\div43$.
   - ___ is close to $3\div4$.
   - Write ___ in the tens place.
   - Write ___ to complete the estimate.

Circle the closer fact to estimate. Write the estimated quotient.

4. $2\div63$:
   - a. $2\div4$  
   - b. $2\div6$  

5. $4\div95$:
   - a. $4\div4$  
   - b. $4\div8$

6. $3\div41$:
   - a. $3\div3$  
   - b. $3\div6$

7. $5\div67$:
   - a. $5\div5$  
   - b. $5\div10$
Do the division. Then write the letters representing the answers to find what Ted says.

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>9</td>
<td>450</td>
</tr>
<tr>
<td></td>
<td>b</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>8</td>
<td>5600</td>
</tr>
<tr>
<td></td>
<td>i</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>8</td>
<td>1600</td>
</tr>
<tr>
<td></td>
<td>p</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>6</td>
<td>3600</td>
</tr>
<tr>
<td></td>
<td>h</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>2100÷7 =</td>
<td></td>
</tr>
<tr>
<td></td>
<td>q</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>5600÷7 =</td>
<td></td>
</tr>
<tr>
<td></td>
<td>g</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>300÷3 =</td>
<td></td>
</tr>
</tbody>
</table>

I like [70 900 10 600 700 3000 800]
Estimating Quotients

Use personal strategies to estimate quotients.

1. At Lakeport Zoo, 119 animals are in 4 groups that are mostly equal. About how many animals are in each group?

2. Estimate each quotient by filling in the blanks.
   a) \(163 \div 2\)
      163 is close to \(16\) tens.
      \(16\) tens \(\div 2 = 8\) tens
      So \(163 \div 2\) is about \(8\).
   b) \(237 \div 8\)
      237 is close to \(24\) tens.
      \(24\) tens \(\div 8 = 3\) tens
      So \(237 \div 8\) is about \(3\).
   c) \(418 \div 6\)
      418 is close to \(40\) tens.
      \(40\) tens \(\div 6 = 7\) tens
      So \(418 \div 6\) is about \(7\).
   d) \(631 \div 9\)
      631 is close to \(63\) tens.
      \(63\) tens \(\div 9 = 7\) tens
      So \(631 \div 9\) is about \(7\).

3. Estimate each quotient.
   a) \(98 \div 5\)
   b) \(324 \div 8\)

4. Owen bought 6 art posters for $311. About how much did each poster cost?
Estimating Quotients

**Goal** Overestimate and underestimate when dividing.

1. Overestimate each division. Show the numbers you used to estimate.

   **Overestimate**
   
   a) $1427 \div 5$
   b) $8\overline{2394}$
   c) $3\overline{1713}$
   d) $5406 \div 7$

2. Underestimate each division. Show the numbers you used to estimate.

   **Underestimate**
   
   a) $1135 \div 2$
   b) $1303 \div 4$
   c) $2645 \div 3$
   d) $4495 \div 6$

3. For each question, is it more accurate to overestimate or underestimate? Explain.

   a) $2914 \div 5$
   b) $3759 \div 6$

4. Estimate to solve each problem. Explain your thinking.

   a) The total attendance at 2 hockey games in March was 9498 people. Approximately what was the average attendance at each game?

   b) Four CDs cost $52.39. Three DVDs cost $48.45. Which item costs more?
9.5 Exploring Division with Greater Numbers

Student Book page 311

Matthew has 456 g of ground beef to make hamburgers. He has 820 mL of juice. He wants to divide the ground beef and juice into equal amounts for his friends.

How many grams of ground beef could Matthew use for each hamburger, and how many millilitres of juice could he use for each drink?

How many hamburgers do you want to make? ________

Use a strategy to divide 456 g into ________ equal groups.

Explain what you did.

How many grams are in each hamburger? ________ g

How many drinks do you want to make? ________

Use a strategy to divide 820 mL into ________ equal groups.

Explain what you did.

How many millilitres are in each drink? ________ mL
9.5 Exploring Division with Greater Numbers

Student Book page 311

GOAL
Use personal strategies to solve division problems.

Matthew has 90 g of ground beef to make hamburgers. He has 75 mL of juice. He wants to divide the ground beef and juice into equal amounts for his friends. Matthew has to be ready for different amounts of guests.

How many grams of ground beef could Matthew use for each hamburger, and how many millilitres of juice could he use for each drink?

Imagine 3 of Matthew's friends want hamburgers.
Use base ten blocks to model 90 g.
90 = _______ tens
Divide the group of tens into 3 equal groups.
_______ tens ÷ 3 = _______ tens
Count the tens in each group.
Each group has _______ tens, which is _______.
Each hamburger has _______ g of beef.

Imagine 5 of Matthew's friends want drinks.
Use counters to divide 75 into 5 equal groups.
How many counters are in each group? _______
75 = _______ + _______ + _______ + _______ + _______
Each drink has _______ mL of juice.

What other strategies can you use to make equal groups of hamburgers and juice? Give an example.
1. Jolie has 808 g of modelling clay. She wants to make 4 creatures that have the same mass. To calculate each mass, Jolie uses base ten blocks to model 808 g.

Divide Jolie's base ten blocks into 4 equal groups to represent 4 creatures. Sketch your groups. What is the mass of each creature?

2. Tai divided 204 g of modelling clay into 4 equal parts. What is the mass of each part? (Hint: Sketch 20 tens and 4 ones blocks.)

3. Use any strategy to solve each division problem.
   a) 366 g of modelling clay, divided into 6 equal parts: $366 \div 6 = \underline{\hspace{2cm}}$
   b) 464 g of modelling clay, divided into 8 equal parts: $464 \div 8 = \underline{\hspace{2cm}}$
Dividing Greater Numbers

Divide a four-digit number by a one-digit number.

1. Estimate and then divide. Show your work.

<table>
<thead>
<tr>
<th>Estimate</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) 2641 ÷ 2</td>
<td></td>
</tr>
<tr>
<td>b) 31201</td>
<td></td>
</tr>
<tr>
<td>c) 63517</td>
<td></td>
</tr>
<tr>
<td>d) 2134 ÷ 9</td>
<td></td>
</tr>
<tr>
<td>e) 61604</td>
<td></td>
</tr>
<tr>
<td>f) 4395 ÷ 5</td>
<td></td>
</tr>
</tbody>
</table>

2. Check two of the answers in Question 1 using multiplication and addition.

3. Eight dolphins in a pod each have about the same mass. Their total mass is about 1195 kg. What is the approximate mass of each dolphin?

   \[ 1855 \div 4 = 463 \text{ R}3 \]

4. Four trucks are ready to transport the 8 dolphins to a marine centre. Each truck can carry 225 kg. Can the trucks carry all the dolphins in one trip? Explain.
139 sled dogs are available for a sled dog race. The dogs will be divided into groups of 6.

**How many teams of 6 can be made with 139 sled dogs?**

**Step 1:** Subtract 6s from 139 to see how many teams there will be.  
Start with 10 teams of 6 dogs per team.  
\[ 6 \times 10 = 60 \]  
There are 60 dogs for 10 teams.  
Subtract 60 dogs from the total number of dogs.  
\[ 139 - 60 = 79 \]

**Step 2:** There are 79 dogs left.  
Subtract another 10 teams of 6 dogs per team.  
\[ 6 \times 10 = 60 \]  
Subtract 60 dogs from the total number of dogs.  
\[ 79 - 60 = 19 \]
9.6 Using Subtraction to Divide  Page 2

**Step 3:** There are 19 dogs left.
Subtract to find out how many teams of 6 dogs can be made.
Use counters if necessary.
How many times did you subtract 6? _____
How many teams of 6 can you make? _____
_____ × 6 = _____

**Step 4:** Complete the subtraction equation.

<table>
<thead>
<tr>
<th>How many teams of 6 can be made with 139 dogs?</th>
</tr>
</thead>
<tbody>
<tr>
<td>139 - 60 = 79</td>
</tr>
<tr>
<td>79 - 60 = 19</td>
</tr>
<tr>
<td>19 - 18 = teams</td>
</tr>
<tr>
<td>teams altogether</td>
</tr>
</tbody>
</table>

**Reflecting**

Cara started by subtracting the number of dogs in 10 teams.
Why was this a good choice?
**Hint:** Think about what number is easiest to multiply by.

She could have used 20 teams instead.
20 = _______ tens
_______ tens × 6 = _______ tens, which is _______.

Why would using 20 teams also be a good choice?

What does the remainder represent?
**Remember:** The dogs had to be in teams of 6.
Checking

1. How many teams of 8 dogs can be made with 342 dogs?
   Start with 10 teams, which is 80 dogs.

\[
\begin{array}{c|c}
8 & 342 \\
- & 80 \\
\hline & 10 \text{ teams}
\end{array}
\]

Use base ten blocks to subtract.

Complete the number line to show your thinking.

\[
\begin{array}{c}
0 \\
\hline
\end{array}
\begin{array}{c}
-80 (10 \text{ teams of 8})
\end{array}
\begin{array}{c}
342
\end{array}
\]

Subtract another team of 10. Use base ten blocks.

\[
\begin{array}{c|c}
8 & 342 \\
- & 80 \\
\hline & 10 \text{ teams}
\end{array}
\begin{array}{c|c}
 & -80 \\
\hline & 10 \text{ teams}
\end{array}
\]

Complete the number line to show your thinking.

\[
\begin{array}{c}
0 \\
\hline
\end{array}
\begin{array}{c}
-80 (10 \text{ teams of 8})
\end{array}
\begin{array}{c}
-80 (10 \text{ teams of 8})
\end{array}
\begin{array}{c}
342
\end{array}
\]
9.6 Using Subtraction to Divide  Page 2

Keep subtracting 10 teams of 8. Show your work.

8) 342

- 80 10 teams

How many dogs are left over? _______

Use the counters to make groups of 8.

- 80 10 teams

How many groups are there? _______

- 80 10 teams

How many dogs are left over? _______

- 80 10 teams

How many teams of 8 are there altogether? Show your work below.


How many extra dogs are there? _______

Practising

7. Chloe's mother worked 197 days this year.

a) If she worked 6 days a week, how many days did she work?

10 \times 6 = _______

Use repeated subtraction to find the answer. Show your work.

She worked _______ weeks.

Explain how you got your answer.

-----------------------------

b) How many weeks did she work if she worked 5 days a week?

Show your work.

5) 197

She worked _______ weeks.

Explain how you got your answer.

-----------------------------
Chapter 9
Lesson 6

Using Subtraction to Divide

GOAL
Divide by subtracting repeatedly.

1. Sydney calculated \(210 \div 6\) using a number line. She started at 210 and subtracted sixes.
   - 5 sixes
   - 10 sixes
   - 10 sixes
   - 10 sixes

   Use Sydney's number line to calculate the quotient. Show your work.

At-Home Help
You can divide by subtracting.
For example:
Calculate \(154 \div 7\).
I will subtract sevens from 154.
I will start by subtracting 10 sevens, or 70.
\(154 - 70 = 84\)
I will subtract 10 more sevens.
\(84 - 70 = 14\)
I know there are 2 sevens in 14. I will add all the sevens together. \(10 + 10 + 2 = 22\), so \(157 \div 7 = 22\).

2. Calculate \(115 \div 5\) by subtracting equal groups.
   Use the number line. \(115 \div 5 = \)______

\[ \begin{array}{c}
0 & \quad & 115
\end{array} \]

3. 175 students were placed in equal groups for a game.
   a) If the students were put in groups of 5, how many groups were there?
   b) If the students were put in groups of 7, how many groups were there?
Dividing with Trading

Follow the steps to find the quotient of \( 81 \div 3 \).

1. Divide the tens.
2. Bring down the ones.
3. Divide again.

\[ \begin{array}{c}
\frac{81}{3} \\
\frac{27}{2} \\
\frac{9}{6}
\end{array} \]

The quotient is 27.

Complete to find the quotient.

1. \[ \begin{array}{c}
6) 84 \\
-6 \\
24
\end{array} \]
2. \[ \begin{array}{c}
4) 64 \\
-4 \\
24
\end{array} \]
3. \[ \begin{array}{c}
5) 75 \\
-5 \\
25
\end{array} \]
4. \[ \begin{array}{c}
3) 76 \\
-6 \\
16
\end{array} \]

Complete.

5. \[ \begin{array}{c}
4) 76 \\
\end{array} \]
6. \[ \begin{array}{c}
5) 85 \\
\end{array} \]
7. \[ \begin{array}{c}
2) 94 \\
\end{array} \]
8. \[ \begin{array}{c}
7) 77 \\
\end{array} \]

For use with MathQuest 5, pages 136 and 137
9.7 Dividing by Sharing  Page 1

**GOAL**

Divide three-digit numbers by one-digit numbers using models and symbols.

A family of 3 has 209 cell-phone minutes to share equally.

How many minutes will each family member get?

**Step 1:** Model 209 with base ten blocks.

```
   2  0  9
/  3 )
```

**Step 2:** Divide the blocks into 3 equal groups.

Trade the 2 hundreds blocks for 20 tens.

```
   2  0  9
/  3 )
```

**Step 3:** Share the 20 tens into 3 equal groups.

```
   6
/  3 )
   1  8  0
-  1  8  0
  2  9
```

How many tens are in each group? ______

_______ tens = _______
9.7 Dividing by Sharing  Page 2

Step 4: How many tens are left over? _______
Trade these tens for ones.
How many ones are there in total? _______
Share the ones into 3 equal groups.

\[
\begin{array}{c}
\text{69} \\
\hline
\text{3} \mid \text{209} \\
\text{180} \\
\text{-27} \\
\text{29} \\
\text{2} \\
\end{array}
\]

How many ones are in each group? _______
How many ones are left over? _______

Step 5: How many tens and ones are in each group? _______ tens _______ ones
Each family member will get _______ minutes with _______ minutes left over.

Reflecting

In Step 3, the 6 tens given to each person was recorded above the 0 and not above the 2. Why?

Hint: Think about what was being shared into equal groups.

In Step 3, 180 was subtracted from 209. Why?

Hint: Look at your answer in Step 3.

How would you have begun if there had been 309 minutes?

Hint: 309 has 3 hundreds blocks in it.
# 9.7 Dividing by Sharing

**Page 1**

*Student Book pages 318–321*

## Checking

1. A family of 4 has 282 cell-phone minutes to share equally.

   a) Use base ten blocks to model 282.

   Draw the blocks in the place value chart below.

<table>
<thead>
<tr>
<th>Hundreds</th>
<th>Tens</th>
<th>Ones</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

   Divide the blocks into 4 equal groups.
   Are there enough hundreds blocks to share equally? _____
   Trade 2 hundreds blocks for 20 tens.
   How many tens blocks are there altogether? _____
   Share the tens blocks in 4 equal groups.
   Are there any tens left over? _____
   Share the ones in 4 equal groups.
   Are there any ones left over? _____
   How many tens and ones are in each group? _____ tens _____ ones
   Each family member gets _____ minutes.

   b) Are there any minutes left over? _____

   Explain your thinking.
   **Hint:** Think about sharing the ones.

a) Estimate whose friends would have more cookies.
   
   318 is about 320. 320 is _______ tens.
   
   _______ tens ÷ 8 = _______ tens, which is _______.
   
   Madeline's friends will get about _______ cookies.
   
   152 is about 150. 150 is _______ tens.
   
   _______ tens ÷ 3 = _______ tens, which is _______.
   
   Jill's friends will get about _______ cookies.

b) Calculate how many cookies Madeline's friends and Jill's friends will get.

   **Madeline:** Divide 318 into 8 equal groups.
   
   Trade the 3 hundreds for _______ tens.
   
   Share the tens into 8 equal groups.
   
   How many tens are in each group? _______. How many tens are left over? _______.
   
   Trade the leftover tens for ones. How many ones are there altogether? _______.
   
   Share the ones into 8 equal groups. How many ones are left over? _______.
   
   Madeline's friends will get _______ cookies each with _______ cookies left over.

   **Jill:** Divide 152 into 3 equal groups.
   
   Trade the 1 hundred for _______ tens.
   
   Share the tens into 3 equal groups.
   
   How many tens are in each group? _______. How many tens are left over? _______.
   
   Trade the leftover tens for ones. How many ones are there altogether? _______.
   
   Share the ones into 3 equal groups. How many ones are left over? _______.
   
   Jill's friends will get _______ cookies each with _______ cookies left over.
   
   There will be _______ cookies left over.
6. Calculate. Use the grids to keep track of the place values.

   a) 
   
   H | T | O
   2
   4 | 9 | 3 | 2
   -8 | 0 | 0

   b) 
   
   3 | 4 | 7 | 3

   c) 
   
   5 | 6 | 0 | 6

   d) 
   
   7 | 4 | 9 | 3
GOAL
Divide three-digit numbers by one-digit numbers using models and symbols.

1. Matthew made a plan to calculate \( 176 \div 8 \).
   Step 1: I need to share 176 base ten blocks into 8 groups.
   I will model 176 as 17 tens and 6 ones.
   Step 2: I can't share 17 tens or 6 ones into 8 groups.
   So I will regroup 176 as 16 tens and 16 ones.
   Step 3: I will share 16 tens and 16 ones into 8 groups.
   Use Matthew’s plan to calculate. Sketch your groupings of base ten blocks.

   At-Home Help
   You can divide by sharing. For example: Calculate \( 316 \div 3 \).
   I will model 316 using base ten blocks.
   \[
   \begin{array}{c}
   \text{316} \\
   \hline
   \text{316} \\
   \end{array}
   \]
   I can share the 3 hundreds among 3 groups. I will rename the 10 and 6 ones as 16 ones. Now I can share the 16 ones among 3 groups, too.
   \[
   \begin{array}{c}
   \text{105} \\
   \hline
   \text{105} \\
   \end{array}
   \]
   Each group has 1 hundred and 5 ones, and there is 1 left over.
   So \( 316 \div 3 = 105 \), with 1 left over.

2. Calculate.
   a) \( 8 \sqrt{328} \)  
   b) \( 9 \sqrt{198} \)  
   c) \( 5 \sqrt{507} \)

3. Desmond sorted his 187 baseball cards into groups of 6.
   How many groups did Desmond make? Show your work.
Checking

1. 5 friends earned $148 to share equally.

   a) Estimate how much money each friend will get.
   $148 is about $150.
   Model 150 with base ten blocks.
   \[ 150 = \underline{____} \text{ tens} \]
   \[ \underline{____} \text{ tens} \div 5 = \underline{____} \text{ tens}, \text{ which is } \underline{____} \text{.} \]
   Each friend will get about $\underline{____}.$

   b) Calculate exactly how much money each friend will get in dollars and cents.
   Share $148 equally into 5 groups.
   How many dollars are in each group? $\underline{____}$
   How many dollars are left over? $\underline{____}$

   Change the dollars left over to dimes.
   \textbf{Hint:} $1.00 \text{ is equal to } 10 \text{ dimes.}$
   How many dimes are there? $\underline{____}$
   Share the dimes equally into 5 groups.
   How many dimes are in each group? $\underline{____} \text{ dimes}, \text{ which is } \underline{____} \text{¢}$
   How many dimes are left over? $\underline{____}$

   Each friend will receive $\underline{____}$ and $\underline{____}$¢.
   Write this amount as a decimal. $\underline{____}$
Practising


   a) He said that each pot cost $7 R1.
      Why should he write the remainder as a decimal?

   b) What is the cost of each pot?
      Divide $71 equally into 10 groups.
      How many dollars are in each group? _______
      How many dollars are left over? _______

      Share the leftover dollars equally into 10 groups using coins.
      How many coins are in each group? _______ ¢
      How much is left over? _______ ¢
      Each pot costs $ _______ and _______ ¢.
      Write the cost as a decimal. $ _______
9.8 Describing Remainders as Decimals  Page 1

Solve division problems with decimal remainders.

Matthew and 3 of his friends earned $218 by doing chores. They want to share this amount equally.

How much money will each friend get?

Step 1: Divide $218 into 4 equal groups.
Think of $218 as $200 + $18.
Divide $200 into 4 equal groups.
$200 ÷ 4 = 50
Each group will receive $50.

Step 2: Divide $18 into 4 equal groups.
Think of $18 as $16 + $2.
Divide $16 into 4 equal groups.
$16 ÷ 4 = _______
Each group will receive $ _______.

Step 3: There are $2 left over.
Share $2 using coins.
How many quarters are in $1? _______
How many quarters are in $2? _______
Hint: Double the number of quarters in $1.
Divide _______ quarters in $2 into 4 equal groups.
Each group will receive _______¢.
9.8 Describing Remainders as Decimals  Page 2

Step 4: Add the amounts from Steps 1 to 3 for each group.
Each group will receive $50 + $_______ + ________¢.
How many dollars will each friend receive? $_______
How many cents will each friend receive? _______¢
Using the chart below, show how many dollars and coins are in each group.

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Step 5: Write each friend’s share as a decimal. _______ _______
Hint: Each $1 as a decimal is 1.0. Each 25¢ as a decimal is 0.25.
Each friend will receive $_______.

Reflecting

Why does it make sense to share $2 as coins?

Why does it make sense to use coins when writing the remainder as a decimal?
Describing Remainders as Decimals

GOAL
Solve division problems with decimal remainders.

You can use quarters and dimes to help you.

1. Express each remainder as a decimal.
   Use quarters.
   
   a) $183 \div 6 = $30 R3

   b) $146 \div 8 = $18 R2

At-Home Help
You can use coins to express a remainder as a decimal. For example, $172 \div 8 = $21 R4. Express the remainder as a decimal.

Solution: $4$ is the same as $16$ quarters. I will share $16$ quarters into $8$ groups. There are $2$ quarters, or $0.50$, in each group.
So $172 \div 8 = $21.50.

2. Ami is dividing $82$ among her $10$ friends. She calculates that each friend will get $8$, with $2$ left over. Finish Ami’s calculation. How much money does each friend get? Use dimes.

3. Five people bought lunch together for $27. Everyone ordered the same thing. How much should each person pay?
Dividing Money

Divide money the same as you would whole numbers. Write the dollar sign and the decimal point in the quotient.

Example:

\[
\begin{array}{c|c}
\text{Divide 768 by 3} & \text{Divide $7.68$ by 3} \\
256 & 2.56 \\
3 & 3 \\
-6 & -6 \\
16 & 16 \\
15 & 15 \\
18 & 18 \\
-18 & -18 \\
0 & 0 \\
\end{array}
\]

Sometimes the divisor leaves you with cents instead of dollars, so you must put a 0 in the quotient before the decimal point.

Example:

\[
\begin{array}{c}
7)2.87 \\
-28 \\
28 \\
\hline
07 \\
-7 \\
\hline
0 \\
\end{array}
\]

I bet you can do these money problems super fast!

Match each problem with its answer.

1. \(5)\$4.20\) \hspace{1cm} a. \$0.70

2. \(2)\$7.76\) \hspace{1cm} b. \$0.23

3. \(7)\$8.05\) \hspace{1cm} c. \$0.84

4. \(4)\$7.44\) \hspace{1cm} d. \$1.12

5. \(6)\$6.72\) \hspace{1cm} e. \$1.12
9.9 Interpreting Remainders Page 1

GOAL

Decide how to deal with the remainder in a division problem.

3 students wrote problems they could solve by calculating \(111 \div 6\).

\[
\begin{array}{c}
6)111 \\
- 60 \\
\hline
51 \\
- 48 \\
\hline
3
\end{array}
\]

How does the problem help you decide what to do with the remainder?

Matthew’s Problem

111 students went for a ride on the Super Coaster. Each car holds 6 people. How many cars did they need?

Solution: \(111 \div 6 = 18 \text{ R}3\)

Answer: 19 cars

Lauren’s Problem

A pizza restaurant served only 6-slice pizzas. At a party 111 slices were eaten. How many pizzas were eaten?

Solution: \(111 \div 6 = 18 \text{ R}3\)

Answer: 18 and \(\frac{1}{2}\) pizzas

Desmond’s Problem

Sara had 111 stickers to give to 6 friends. She wanted to give all of her friends the same number of stickers. How many stickers did each friend get?

Solution: \(111 \div 6 = 18 \text{ R}3\)

Answer: 18 stickers each

A. Why do you think Matthew gave 19 as his answer?

Hint: No one can be left behind.

B. Lauren’s remainder is 3. She wrote this as \(\frac{1}{2}\).

1 pizza = 6 slices

Colour in 3 slices of pizza.

Circle the amount of pizza you coloured in. \(\frac{1}{2}\) \(\frac{1}{4}\)

Why did Lauren represent the remainder as a fraction in her answer?
C. Desmond calculated 18 R3 but left the remainder out of his answer. Why?
   **Hint:** Stickers cannot be broken into pieces.

D. How did knowing what the problem is about help you decide what to do with the remainder?
   **Hint:** Think about whether everything can or cannot be shared equally.

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**Reflecting**

Write a problem in which you would deal with an answer in each of the following ways. Round up the answer to the next whole number:

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Write the remainder as a fraction or decimal:

---

Ignore the remainder:
Checking

1. Chantal has 158 photos to arrange in an album. She wants to put 4 photos on each page.
   
   a) Divide 158 into 4 equal groups.
      Can you share 1 hundred into 4 groups? _______
      Trade the 1 hundred for _______ tens.
      Share the tens into 4 equal groups. Draw the groups in the space below.
      
      How many tens are left over? _______
      Trade the leftover tens for ones. How many ones are there altogether? _______
      Share the ones into 4 equal groups. Draw the groups in the space below.
      
      How many ones are left over? _______
      Each group has _______ tens and _______ ones.
      Chantal will need _______ pages.
      _______ photos are left over.

   b) Can any photos be left out of the album? _______
      What can you do with the remainder?
      
      How many pages will Chantal need? _______
Practising

5. Use base ten blocks, play money, or a personal strategy to divide and solve each problem. Show your work and explain what you did with the remainder.

a) Nadine uses 4 pieces of wood to make a picture frame. She has 518 pieces of wood. How many frames can she make?
   \[ 518 \div 4 = \underline{\ \ \ } \]

b) Cupcakes come in packages of 6. Jesse needs 157 cupcakes. How many packages should he buy?
   \[ 157 \div 6 = \underline{\ \ \ } \]

c) Lisa and her 3 friends earned $225. They will share the money equally. How much money will each of them get?
   \[ 225 \div 3 = \underline{\ \ \ } \]
Interpreting Remainders

GOAL

Decide how to deal with the remainder in a division problem.

1. It takes 6 pieces of wood to make a box. Rachel's class has 302 pieces of wood.
   a) How many boxes can the class make?

   b) What did you do with the remainder? Why?

2. Mateo is buying pencils for the school fair. There are 5 pencils in each package. Mateo needs 68 pencils.
   a) How many packages should he buy?

   b) What did you do with the remainder? Why?

3. Six students earned $243. They divided the money equally.
   a) How much money did each student get?

   b) What did you do with the remainder? Why?
Example:

1. 2 \times 357

2. 4 \times 975

3. 5 \times 253

4. 9 \times 398

5. 8 \times 591

6. 8 \times 439

Solve for the quotients.

1. 15 \div 15 = 1

2. 16 \div 21 = \frac{16}{21}

3. 22 \div 31 = \frac{22}{31}

4. 27 \div 30 = \frac{27}{30}

5. 5 \div 7 = \frac{5}{7}

6. 8 \div 13 = \frac{8}{13}

Match each problem to its quotient. Some may have a remainder.
1. 240 cans were packed in equal boxes. There were fewer than 10 boxes. How many boxes could there be? List 3 possibilities.

2. Some friends sold 125 magazines to raise money for a trip. There were fewer than 10 people in the group. Each person sold the same number of magazines.
   a) How many people were in the group? Use guessing and testing to solve.
   b) How many magazines did each person in the group sell?

3. Another group sold 336 magazines. There were fewer than 10 people in the group. Each person sold the same number of magazines.
   a) How many people could be in the group? List 3 possibilities.
   b) For each possibility, how many magazines did each person sell?
Chapter 9  

Test Yourself

Circle the correct answer.

1. Calculate $35 \div 7$.
   A. 1  
   B. 3  
   C. 5  
   D. 7

2. Calculate $42 \div 6$.
   A. 6  
   B. 5  
   C. 8  
   D. 7

3. Calculate $120 \div 6$.
   A. 10  
   B. 20  
   C. 50  
   D. 30

4. Calculate $400 \div 2$.
   A. 200  
   B. 150  
   C. 75  
   D. 80

5. Calculate $540 \div 9$.
   A. 50  
   B. 30  
   C. 14  
   D. 60

6. Estimate $322 \div 8$. Use your estimate to identify the correct answer below.
   A. 20.25  
   B. 50.25  
   C. 30.25  
   D. 40.25

7. Calculate $76 \div 4$.
   A. 17  
   B. 19  
   C. 21  
   D. 23

8. Jay and 5 friends baked 414 muffins for a bake sale. Each person baked the same number of muffins. How many muffins did each person bake?
   A. 69 muffins  
   B. 82 muffins  
   C. 23 muffins  
   D. 77 muffins

9. Cara divided 123 marbles equally into 6 bags. How many marbles were left over?
   A. 1 marble  
   B. 2 marbles  
   C. 5 marbles  
   D. 3 marbles

10. Four people divided $86 evenly between them. How much money did each person get?
    A. $19.75  
    B. $20.25  
    C. $21.50  
    D. $22.25
Estimating Quotients

Estimate $3\overline{7}3$.

When you estimate you do not need an exact answer.

Use a smaller fact close to $3\overline{7}$.

$3\overline{7}3$ is a smaller fact close to $3\overline{7}$.

Write 2 in the tens place.

The estimate is 20.

Estimate.

1. $4\overline{6}8$  

$4\overline{4}$ is close to $4\overline{6}$.

Write __ in the tens place.

Write ___ to complete the estimate.

2. $2\overline{5}7$  

____ is close to $2\overline{5}$.

Write ____ in the tens place.

Write ____ to complete the estimate.

3. $3\overline{4}3$  

____ is close to $3\overline{4}$.

Write ____ in the tens place.

Write ____ to complete the estimate.

Circle the closer fact to estimate. Write the estimated quotient.

4. $2\overline{6}3$  

a. $2\overline{4}$  

b. $2\overline{6}$  

5. $4\overline{9}5$  

a. $4\overline{4}$  

b. $4\overline{8}$  

6. $3\overline{4}1$  

a. $3\overline{3}$  

b. $3\overline{6}$  

7. $5\overline{6}7$  

a. $5\overline{5}$  

b. $5\overline{10}$
Dividing with Trading

Follow the steps to find the quotient of $81 \div 3$.

Divide the tens $\rightarrow$ Bring down the ones $\rightarrow$ Divide again.

The quotient is $27$.

Complete to find the quotient.

1. $\begin{array}{c|c}
6 & 8 \linebreak 4 \\
\hline
6 & 1 \\
\hline
2 & \end{array}$

2. $\begin{array}{c|c}
4 & 6 \linebreak 4 \\
\hline
4 & \end{array}$

3. $\begin{array}{c|c}
5 & 7 \linebreak 5 \\
\hline
5 & \end{array}$

4. $\begin{array}{c|c}
4 & 3 \linebreak 8 \linebreak 8 \\
\hline
2 & \end{array}$

Complete.

5. $\begin{array}{c|c}
4 & 7 \linebreak 6 \\
\hline
\end{array}$

6. $\begin{array}{c|c}
5 & 8 \linebreak 5 \\
\hline
\end{array}$

7. $\begin{array}{c|c}
2 & 9 \linebreak 4 \linebreak 7 \linebreak 7 \\
\hline
\end{array}$

8. $\begin{array}{c|c}
\end{array}$

For use with MathQuest 5, pages 136 and 137
Dividing 2-Digit Numbers

Follow the steps to divide.

1. Divide the tens.
2. Bring down the ones.
3. Divide again.

Check your answer by multiplying 6 and 14 and adding 4 to the product.

Complete.

1. \[ \begin{array}{c|c|c}
   4 & 7 & 4 \\
   \hline
   3 & 4 & \\
   \end{array} \quad \begin{array}{c|c|c}
   5 & 6 & 8 \\
   \hline
   5 & 1 & \\
   \end{array} \quad \begin{array}{c|c|c}
   6 & 9 & 2 \\
   \hline
   6 & 3 & \\
   \end{array} \quad \begin{array}{c|c|c}
   3 & 8 & 3 \\
   \hline
   & 6 & \\
   \end{array} \]

Divide.

5. \[ \begin{array}{c|c|c}
   5 & 9 & 2 \\
   \hline
   & R & \\
   \end{array} \]

6. \[ \begin{array}{c|c|c}
   3 & 6 & 5 \\
   \hline
   & R & \\
   \end{array} \]

7. \[ \begin{array}{c|c|c}
   8 & 9 & 7 \\
   \hline
   & R & \\
   \end{array} \]

8. \[ \begin{array}{c|c|c}
   2 & 5 & 7 \\
   \hline
   & R & \\
   \end{array} \]
Estimating Quotients

Estimate the quotient of \(3\overline{)238}\).

First think of an easier division. \[3\overline{)238}\]
Then think of a smaller division fact close to \(3\overline{)23}\).[3\overline{)21}\]
Record your estimate. \[3\overline{)238}\]
Write 7 in the tens place.[3\overline{)238}\]
Write 0 to complete the estimate.

The estimated quotient is \(70\).

Estimate the quotient.

1. \(4\overline{)253}\)
   
   Think: it is easier to divide \(4\overline{)123}\).
   A close division fact is \(4\overline{)124}\).

2. \(5\overline{)698}\)
   
   Think: it is easier to divide \(5\overline{)165}\).
   A close division fact is \(5\overline{)16}\).

3. \(2\overline{)521}\)
   
   Think: it is easier to divide \(2\overline{)15}\).
   A close division fact is \(2\overline{)1}\).

4. \(7\overline{)437}\)
   
   Think: it is easier to divide \(7\overline{)15}\).
   A close division fact is \(7\overline{)1}\).

Estimate the quotient. Write a division fact that helps.

5. \(2\overline{)137}\)
   
   6. \(4\overline{)923}\)
   
   7. \(3\overline{)736}\)

Estimate the quotient.

8. \(8\overline{)586}\)
9. \(7\overline{)655}\)
10. \(4\overline{)265}\)
11. \(6\overline{)532}\)
1. Describe two ways to calculate $36 \div 9$.

2. Calculate.
   a) $18 \div 6 = \underline{\hspace{2cm}}$  
   b) $32 \div 8 = \underline{\hspace{2cm}}$  
   c) $27 \div 3 = \underline{\hspace{2cm}}$  
   d) $35 \div 5 = \underline{\hspace{2cm}}$  
   e) $42 \div 7 = \underline{\hspace{2cm}}$  
   f) $14 \div 2 = \underline{\hspace{2cm}}$

3. A restaurant ordered 42 candles in packages of 6.
   How many packages did they order? Use a number line. Then answer

   \[ \begin{array}{c}
   \text{0} \quad \text{42}
   \end{array} \]

4. Ella read 320 minutes over 8 days.
   She read the same amount each day.
   How many minutes did she read each day? Show your work

5. Estimate. Rounding with no remainders.
   a) $251 \div 5$ is about $\underline{\hspace{2cm}}$  
   b) $178 \div 9$ is about $\underline{\hspace{2cm}}$  
   c) $433 \div 6$ is about $\underline{\hspace{2cm}}$  
   d) $632 \div 8$ is about $\underline{\hspace{2cm}}$
9. A 520 cm piece of aluminum wire is cut into 8 equal pieces. How long is each piece? Use base ten blocks to answer.

<table>
<thead>
<tr>
<th>Hundreds</th>
<th>Tens</th>
<th>Ones</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>64</td>
<td>50</td>
</tr>
</tbody>
</table>

10. A soccer field measures approximately 110 m long. A cone is placed every 8 m along the field. How many cones are needed? Use long division and show your work.

11. Anthony spent $231 on 6 jackets. How much did each jacket cost if they all cost the same amount? Solve remainders as decimals.

12. \( 6\div549 \quad R \) ___

13. \( 7\div85 \quad R \) ___