Chapter 6: Multiplication and Division Facts

Sharing and Grouping

**GOAL**

Use 2 meanings of division to solve problems.

1. **Calculate.**
   
   a) \( 4 \div 16 \)  
   b) \( 5 \div 20 \)  
   c) \( 2 \div 14 \)  
   d) \( 8 \div 32 \)  
   e) \( 5 \div 35 \)  
   f) \( 9 \div 27 \)  
   g) \( 6 \div 36 \)  
   h) \( 12 \div 24 \)

2. **Calculate.**
   
   a) \( 30 \div 3 = \)  
   b) \( 15 \div 5 = \)  
   c) \( 10 \div 2 = \)  
   d) \( 12 \div 4 = \)  
   e) \( 24 \div 8 = \)  
   f) \( 40 \div 2 = \)  
   g) \( 25 \div 5 = \)  
   h) \( 36 \div 4 = \)

3. Ken placed 42 beads in 6 equal groups. How many beads are in each group? Use a drawing or a number line to help you solve the problem.

4. Samia gave the same number of beads to each of 7 friends. She started with 56 beads. How many beads did she give to each friend?
Division

Division is a way to find out how many times one number is contained in another number. The ÷ sign means “divided by.” Another way to divide is to use $\frac{\text{dividend}}{\text{divisor}}$. The dividend is the larger number that is divided by the smaller number, or divisor. The answer of a division problem is called the quotient.

Directions: Study the example. Divide.

Example:

\[ \frac{20}{4} = 5 \]

\[ \frac{35}{7} = \_ \_ \_ \]
\[ \frac{42}{6} = \_ \_ \_ \]

\[ \frac{2}{12} \]
\[ \frac{3}{18} \]
\[ \frac{4}{36} \]
\[ \frac{5}{50} \]

\[ \frac{6}{24} \]
\[ \frac{7}{21} \]
\[ \frac{8}{32} \]
\[ \frac{9}{27} \]

\[ \frac{36}{6} = \_ \_ \_ \]
\[ \frac{28}{4} = \_ \_ \_ \]
\[ \frac{15}{5} = \_ \_ \_ \]
\[ \frac{12}{2} = \_ \_ \_ \]

A tree farm has 36 trees. There are 4 rows of trees. How many trees are there in each row?

\[ \_ \_ \_ \_ \]
6.7 Sharing and Grouping Page 1

Student Book pages 188–190

GOAL
Use 2 meanings of division to solve problems.

Checking

1. a) This is a sharing problem.

Hari’s family composted 42 kg of scraps in 7 weeks.

How many kilograms of scraps did they compost each week?

\[
\frac{42}{7} = \frac{\text{total kilograms of scraps}}{\text{number of weeks}} = \text{kilograms of scraps in each week}
\]

Separate the 42 kg of scraps into the 7 weeks.

Start by adding 1 piece at a time.

\[ \bigcirc \bigcirc \bigcirc \bigcirc \bigcirc \bigcirc \]

\[ 42 \div 7 = \underline{6} \text{ kg} \]

Hari’s family composted _____ kg of scraps each week.

b) This is a grouping problem.

Hari’s family composted 6 kg of scraps each week.

How many weeks did it take them to compost 42 kg?

\[
\frac{42}{6} = \frac{\text{total kilograms of scraps}}{\text{kilograms of scraps per week}} = \text{how many weeks}
\]

Use the number line below.

Start at 42 and keep subtracting by 6 to get to 0.

\[ 0 \hspace{0.5cm} 6 \hspace{0.5cm} 12 \hspace{0.5cm} 18 \hspace{0.5cm} 24 \hspace{0.5cm} 30 \hspace{0.5cm} 36 \hspace{0.5cm} 42 \]

There are _____ groups of 6 in 42.

\[ 42 \div 6 = \underline{7} \]

It took Hari’s family _____ weeks to compost the 42 kg of scraps.
Practising

4. Calculate. Show both sharing and grouping.

a) 6 \div 18

\[ \begin{array}{cccccc}
0 & 6 & 12 & 18 \\
\hline
\end{array} \]

\[ 18 \div 6 = \boxed{} \]

b) 3 \div 21

\[ \begin{array}{cccccc}
0 & 3 & 6 & 9 & 12 & 15 & 18 & 21 \\
\hline
\end{array} \]

\[ 21 \div 3 = \boxed{} \]

c) 8 \div 48

\[ \begin{array}{cccccc}
0 & 8 & 16 & 24 & 32 & 40 & 48 \\
\hline
\end{array} \]

\[ 48 \div 8 = \boxed{} \]

d) 4 \div 28

\[ \begin{array}{cccccc}
0 & 4 & 8 & 12 & 16 & 20 & 24 & 28 \\
\hline
\end{array} \]

\[ 28 \div 4 = \boxed{} \]
4. Calculate. Use sharing into equal groups and grouping on a number line. The first one is done for you.

a) $6 \overline{)18}$

![Diagram of 18 circles divided into 6 groups of 3]

$18 \div 6 = \underline{\phantom{00}} 6 \overline{)18}$

b) $3 \overline{)21}$

![Diagram of 21 circles divided into 3 groups of 7]

$21 \div 3 = \underline{\phantom{00}} 3 \overline{)21}$
Scaffolding for Lesson 7, Question 4

STUDENT BOOK PAGE 190

c) \( \frac{8}{48} \)

\[
\begin{array}{cccc}
\frac{8}{48} \\
\frac{1}{6} \\
\frac{1}{6} \\
\frac{1}{6} \\
\frac{1}{6} \\
\frac{1}{6} \\
\frac{1}{6} \\
\end{array}
\]

\[48 \div 8 = \frac{8}{48}\]

d) \( \frac{4}{28} \)

\[
\begin{array}{cccc}
\frac{4}{28} \\
\frac{1}{7} \\
\frac{1}{7} \\
\frac{1}{7} \\
\frac{1}{7} \\
\frac{1}{7} \\
\frac{1}{7} \\
\end{array}
\]

\[28 \div 4 = \frac{4}{28}\]
Maria has 4 friends coming over. She has a package of 20 cookies to share with them. How many cookies should each child, including Maria, get if they all share fairly?

**BASICS BOX**

Division is an operation that helps us to share an amount into equal groups. It is the opposite of multiplication. Multiplication helps us understand, solve, and even check division problems.

Maria has 20 cookies. She has to divide them among 5 people. We could solve with a picture:

![Cookie Division](image)

We can write an equation like this:

\[ \text{divisor} \rightarrow 5 \div 20 \quad \text{OR} \quad 20 \div 5 = ? \]

If we think about division with multiplication we think \( 20 \div 5 = \) is the same as \( 5 \times \) \(_\) = 20. We see that since \( 5 \times 4 = 20 \) then \( 20 \div 5 = 4 \). So each child would get 4 cookies.

**PRACTICE**

Find the quotients.

1. \( 18 \div 2 = \) 

2. \( 12 \div 6 = \) 

3. \( 42 \div 6 = \) 

4. \( 9 \div 27 \) 

5. \( 3 \div 24 \) 

6. \( 5 \div 45 \) 

**JOURNAL**

What multiplication fact would help you solve \( 56 \div 8 = ? \)
Introducing Division: One-Digit Divisors
Without Remainders

Find the quotients.

1. 1)9

2. 6)48

3. 6 ÷ 6 =

4. 21 ÷ 7 =

5. 5)30

6. 3)15

7. 9 ÷ 3 =

8. 20 ÷ 4

9. 8)64

10. 6)36

11. 28 ÷ 7 =

12. 14 ÷ 2 =

13. 8)56

14. 5)25

Review.

15. 3 × 8 =

16. 7 × 6 =

17. 4 × 20 =

18. 25 × 10 =

19. 50 × 50 =

20. 500 × 50 =
6.8 Division and Multiplication Page 1
Student Book pages 192–195

GOAL
Divide by using related multiplication facts.

Problem
Some students want to play a game called Four Square.

There are 24 students who want to play.
4 students can play at a time.

How many games will need to be played so that everyone gets a turn?

Use counters to make an array showing the 24 students in groups of 4.

Describe your array using both multiplication and division.
The students can make 6 groups of 4.

4 × 6 = ______

24 students divided into groups of 4 is the same as writing:
24 ÷ 4 = ______

How many games will need to be played so that everyone gets a turn? ______
Reflecting

In the division equation $27 \div 3 = 9$, 27 is the **dividend** and 3 is the **divisor**. The answer 9 is the **quotient**.

In the division equation $24 \div 4 = \underline{\hspace{2cm}}$, what is the dividend? _____

How could you use multiplication to check your answer when you divide? Use $20 \div 5$ to help you explain.

[Diagram showing division terms: dividend, divisor, quotient]
6.8 Division and Multiplication Page 1
Student Book pages 192–195

GOAL
Divide by using related multiplication facts.

Checking

1. 45 students want to play Turtle Catcher in equal groups of 5.
   Share 45 counters into circles of 5.
   The first one is done for you.

   ⊙〇〇〇〇〇

   How many circles did you make? _________

Write a division sentence for this problem:

_________________________  ÷  ______________________ =  ______________________
    number of students        number in each group       number of circles needed

Write a multiplication sentence to check your answer.

_________________________  ×  ______________________ =  ______________________
    number in a group         number of circles         number of students

There are _______ groups of _______ in 45.
45 ÷ 5 = _______

Check your answer by using multiplication.

_______ × 5 = 45
6.8 Division and Multiplication Page 2

**Practising**

2. Barrett used 32 counters to make this array.

![Array of counters]

How many counters are in each row? ________

How many rows are in the array? ________

What numbers will he probably write in each equation?

\[ \_ \times \_ = 32 \]

\[ 32 \div \_ = \_ \]

4. 36 students are going on a guided nature walk at the Kerry Wood Nature Centre in Red Deer, Alberta.

They must have at least 1 adult supervisor for every 6 students.

**Hint:** Use 36 counters to represent the students.

There are ________ groups of ________ in ________.

Use division and multiplication sentences to show your work.

\[ \_ \times \_ = \_ \]

\[ \_ \div \_ = \_ \]

How many adults are needed to supervise the students? ________
Chapter 6
Lesson 8

Division and Multiplication

GOAL

Divide by using related multiplication facts.

1. Use each multiplication fact to calculate the quotient.
   a) $4 \times 5 = 20$, so $20 \div 5 = \underline{\hspace{2cm}}$
   b) $3 \times 6 = 18$, so $18 \div 3 = \underline{\hspace{2cm}}$
   c) $10 \times 4 = 40$, so $40 \div 10 = \underline{\hspace{2cm}}$
   d) $2 \times 16 = 32$, so $32 \div 16 = \underline{\hspace{2cm}}$

2. Calculate.
   a) $15 \div \underline{\hspace{2cm}} = 3$  
      c) $\underline{\hspace{2cm}} \div 6 = 4$
   b) $6 \div \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$
   d) $49 \div 7 = \underline{\hspace{2cm}}$

3. Calculate.
   a) $5 \overline{)50}$  
      b) $9 \overline{)63}$  
      c) $8 \overline{)48}$  
      d) $8 \overline{)72}$

4. An airplane has 30 seats placed in rows of 5. How many rows are there?

5. François organizes 28 students into 7 groups. How many students are in each group?

6. Michael has $36. He gives $6 to each friend. How many friends get $6?
# Matching Pairs Game Cards

Math Game: Matching Pairs

<p>| | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>$9 \times 9 = 9$</td>
<td>$27 \times 9 = 243$</td>
<td>$45 \div 9 = 5$</td>
<td>$21 \times 3 = 63$</td>
<td>$54 \times 6 = 324$</td>
<td>$64 \div 8 = 8$</td>
<td></td>
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<tr>
<td>$9 \div 9 = 1$</td>
<td>$24 \div 8 = 3$</td>
<td>$35 \div 7 = 5$</td>
<td>$49 \div 7 = 7$</td>
<td>$45 \div 5 = 9$</td>
<td>$32 \div 4 = 8$</td>
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<tr>
<td>$6 \div 6 = 1$</td>
<td>$14 \times 7 = 98$</td>
<td>$36 \times 9 = 324$</td>
<td>$48 \times 8 = 384$</td>
<td>$72 \div 9 = 8$</td>
<td>$60 \div 6 = 10$</td>
<td></td>
</tr>
<tr>
<td>$9 \times 0 = 0$</td>
<td>$18 \div 9 = 2$</td>
<td>$20 \div 5 = 4$</td>
<td>$36 \div 6 = 6$</td>
<td>$56 \div 7 = 8$</td>
<td>$90 \div 9 = 10$</td>
<td></td>
</tr>
</tbody>
</table>

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*Chapter 6: Multiplication and Division Facts*
6.9 Patterns in a Multiplication Table

Use number patterns in a table to multiply and divide.

Problem

How can you use patterns in a multiplication table to help you multiply and divide?

<table>
<thead>
<tr>
<th>x</th>
<th>1</th>
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<td>25</td>
<td>30</td>
<td>35</td>
<td>40</td>
<td>45</td>
<td>50</td>
</tr>
</tbody>
</table>

da) Look across the row that begins with 2.
   Describe patterns you see.

b) Look down the column that begins with 5.
   Describe patterns you see.

c) Look down the column that begins with 8.
   Describe patterns you see.
6.9 Patterns in a Multiplication Table

Student Book page 196

**GOAL:**

Use number patterns in a table to multiply and divide.

**How can you use patterns in a multiplication table to multiply and divide?**

<table>
<thead>
<tr>
<th>×</th>
<th>0</th>
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<th>3</th>
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</tr>
</tbody>
</table>

Pattern 1: What do you notice when you multiply numbers by 0?


Pattern 2: What do you notice when you multiply numbers by 1?


Pattern 3: What happens when you divide a number by 1? Why?


Pattern 4: What happens when you divide a number by itself? Why?
Patterns in a Multiplication Table

**GOAL**
Use number patterns in a table to multiply and divide.

1. Fill in the blanks in the multiplication table. Look for patterns to help you.

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<td>18</td>
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<td>36</td>
<td>45</td>
<td>54</td>
<td>63</td>
<td>72</td>
<td>81</td>
</tr>
</tbody>
</table>

2. Describe one pattern you noticed.

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Division: Zero And One

Directions: Study the rules of division and the examples. Divide, then write the number of the rule you used to solve each problem.

Examples:

Rule 1: \[
\begin{array}{c}
5 \\
1 \\
\end{array}
\]
Any number divided by 1 is that number.

Rule 2: \[
\begin{array}{c}
1 \\
5 \\
\end{array}
\]
Any number except 0 divided by itself is 1.

Rule 3: \[
\begin{array}{c}
0 \\
7 \\
\end{array}
\]
Zero divided by any number is zero.

Rule 4: \[
\begin{array}{c}
0 \\
7 \\
\end{array}
\]
You cannot divide by zero.

\[
\begin{array}{c}
6 \\
1 \\
\end{array}
\]
Rule 1

\[
\begin{array}{c}
4 \\
1 \\
\end{array}
\]
\[
\begin{array}{c}
9 \\
9 \\
\end{array}
\]
\[
\begin{array}{c}
7 \\
1 \\
\end{array}
\]
\[
\begin{array}{c}
6 \\
0 \\
\end{array}
\]

\[
\begin{array}{c}
1 \\
4 \\
\end{array}
\]
Rule ___

\[
\begin{array}{c}
1 \\
4 \\
\end{array}
\]
Rule ___

\[
\begin{array}{c}
9 \\
0 \\
\end{array}
\]
Rule ___

\[
\begin{array}{c}
9 \\
0 \\
\end{array}
\]
Rule ___

\[
\begin{array}{c}
6 \\
0 \\
\end{array}
\]
Rule ___

\[
\begin{array}{c}
0 \\
4 \\
\end{array}
\]
Rule ___

\[
\begin{array}{c}
4 \\
1 \\
\end{array}
\]
Rule ___

\[
\begin{array}{c}
4 \\
1 \\
\end{array}
\]
Rule ___

\[
\begin{array}{c}
2 \\
3 \\
\end{array}
\]
Rule ___

\[
\begin{array}{c}
3 \\
2 \\
\end{array}
\]
Rule ___

\[
\begin{array}{c}
6 \\
1 \\
\end{array}
\]
Rule ___

\[
\begin{array}{c}
1 \\
6 \\
\end{array}
\]
Rule ___

\[
\begin{array}{c}
5 \\
1 \\
\end{array}
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Rule ___

\[
\begin{array}{c}
9 \\
1 \\
\end{array}
\]
Rule ___

\[
\begin{array}{c}
7 \\
1 \\
\end{array}
\]
Rule ___

\[
\begin{array}{c}
6 \\
0 \\
\end{array}
\]
Rule ___
6.10 Solving Problems by Working Backwards Page 1
Student Book pages 198–199

**GOAL**
Work backwards to solve a problem.

**Problem**
Annie shared some baseball cards with 6 friends.
Each friend got 5 cards.

How many baseball cards did Annie start with?

**Understand the Problem**
You need to figure out how many cards Annie started with.

**Make a Plan**
Draw a picture to show the parts of the problem you know.
How many friends got cards? ______
Draw circles to represent the friends.

How many cards did each friend get? ______
Put Xs in the circles to show the number of cards one friend got.

Carry Out the Plan
Use what you know about how many cards each friend got to figure out the cards Annie started with.

6 friends × 5 cards = ______
How many cards did Annie start with? ______
Reflecting

How can you check the answer?

How did starting with what you know about how many cards each friend had at the end help you to solve the problem?
6.10 Solving Problems by Working Backwards

Student Book pages 198–199

GOAL
Work backwards to solve problems.

Checking

1. Taylor sorted some stickers into 7 equal groups.
   Then she sorted each group into 4 piles of 2 stickers.
   a) Show the steps of the problem.

Understand the Problem
Figure out how many stickers Taylor started out with.

Make a Plan
Fill in the blanks in the diagram.

| Number of stickers Taylor started with | ÷ | How many groups? | ÷ | How many piles? | = | 2 stickers in each pile |

b) Now work backwards.

Carry Out the Plan

\[ 2 \times \underline{\underline{\text{How many piles?}}} \times \underline{\underline{\text{How many groups?}}} = \underline{\underline{\text{Number of stickers Taylor started with}}} \]

\[ 2 \times \underline{\underline{2}} \times \underline{\underline{4}} = \underline{\underline{16}} \]

Taylor had _______ stickers altogether.

c) Look Back

Use the first diagram.
\[ \underline{\underline{2}} \div \underline{\underline{4}} \div \underline{\underline{7}} = 2 \]
Practising

2. Ryan is making a wire sculpture.
   He cut a wire into 4 equal pieces.
   Then he cut 2 cm from each piece so each piece was 7 cm long.
   How long was the wire he started with?

Understand the Problem
I need to figure out _________________________.

Make a Plan
Use a diagram to show every step of the problem.

Each piece was ____ cm long in the end

Carry Out the Plan
Now work backwards to solve the problem.

The wire was ______ cm when Ryan started.
Circle the correct answer.

1. Diane skip counted on a number line to multiply. What 2 numbers did she multiply?
   A. 4 and 4  B. 4 and 6  C. 4 and 7  D. 4 and 8

2. Which multiplication fact helps you to calculate $6 \times 9$?
   A. $6 \times 8 = 48$  B. $9 \times 9 = 81$  C. $6 \times 5 = 30$  D. $6 \times 2 = 12$

3. If you double $3 \times 6 = 18$, what new multiplication fact do you get?
   A. $6 \times 3 = 18$  B. $9 \times 6 = 54$  C. $3 \times 3 = 9$  D. $6 \times 6 = 36$

4. There are 60 cookies in 5 packages of 12 cookies. How many cookies are in 5 packages of 6 cookies?
   A. 15  B. 30  C. 45  D. 60

5. Which $10\times$ fact helps you to calculate $9 \times 5$?
   A. $10 \times 8 = 80$  B. $10 \times 4 = 40$  C. $10 \times 5 = 50$  D. $10 \times 10 = 100$

6. What is the missing number in this division sentence?
   $32 \div 8 = \underline{}$
   A. 5  B. 3  C. 7  D. 4

7. Annie has $40. She wants to buy T-shirts that cost $10 each. How many T-shirts can she buy?
   A. 4  B. 3  C. 5  D. 2

8. Cory cut a piece of string into 3 equal parts. He cut each piece of string into 2 equal parts so each piece was 2 cm long. How long was Cory's string to start with?
   A. 6 cm  B. 12 cm  C. 15 cm  D. 9 cm
Division Concepts

4 rows of 5 apples are 20 apples altogether.

\[ 4 \times 5 = 20 \quad 5 \times 4 = 20 \]
\[ 20 \div 4 = 5 \quad 20 \div 5 = 4 \]

Complete the sentences.

1. _____ rows of _____ pears are _____ pears altogether.
   _____ \times _____ = _____  _____ + _____ = _____
   _____ \times _____ = _____  _____ + _____ = _____

2. _____ rows of _____ bananas are _____ bananas altogether.
   _____ \times _____ = _____  _____ \div _____ = _____
   _____ \times _____ = _____  _____ \div _____ = _____

If we share 20 apples among 4 people, each person gets 5 apples.

\[ 20 \div 4 = 5 \]

If we share 20 apples among 5 people, each person gets 4 apples.

\[ 20 \div 5 = 4 \]

Complete.

3. If we share 32 bananas among 8 people, each person gets _____ bananas.
   _____ \div _____ = _____

Write a division sentence to show the sharing.

4. Share 45 oranges among 9 people.
Chapter 6: Multiplication and Division Facts

Multiplication as Repeated Addition
You can use repeated addition, skip counting, a number line, or arrays to multiply.
5 + 5 + 5 + 5 is repeated addition.
5, 10, 15, 20 is skip counting.

1. Write the next 2 numbers in each skip counting pattern.
   a) 4, 8, 12, ______, ______
   b) 3, 6, 9, ______, ______

2. Calculate.
   a) 2 + 2 + 2 + 2 + 2 = ______
   b) 4 + 4 + 4 + 4 = ______

3. Write an addition sentence for each multiplication. Then calculate.
   a) 3 \times 5 \text{___________________}
   d) 1 \times 4 \text{___________________}
   b) 5 \times 4 \text{___________________}
   e) 2 \times 3 \text{___________________}
   c) 5 \times 5 \text{___________________}
   f) 4 \times 2 \text{___________________}

4. Write an addition sentence and a multiplication sentence for each picture.
   a) 
   ______ + ______ + ______ + ______ = ______
   ______ \times ______ = ______

   b) 
   ______ + ______ + ______ + ______ = ______
   ______ \times ______ = ______

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5. Write the multiplication sentence.

\[ \begin{array}{cccccccc}
0 & 4 & 8 & 12 & 16 & 20 & 24 \\
\uparrow & \uparrow & \uparrow & \uparrow & \uparrow & \uparrow & \uparrow \\
+4 & +4 & +4 & +4 & +4 & +4 & +4
\end{array} \]

\[ \_ \_ \times \_ \_ \_ = \_ \_ \_ \]


Complete the multiplication sentences.

\[ 5 \times \_ \_ \_ = \_ \_ \_ \]

\[ 3 \times \_ \_ \_ = \_ \_ \_ \]

**Division as Equal Sharing**

You can use division to share. For example, 20 books can be shared among 5 groups. \(20 \div 5 = 4\), so there are 4 books in each group.

7. 15 students need to be divided into 3 groups.

How many students will be in each group?

\[ \_ \_ \div \_ \_ \_ = \_ \_ \_ \]

**Division as Equal Grouping**

You can use division to figure out the number of groups. For example, 20 books are in groups of 4. \(20 \div 4 = 5\), so there are 5 groups.

8. 15 students need to be divided into groups of 3 for an activity.

How many groups will there be?

\[ \_ \_ \div \_ \_ \_ = \_ \_ \_ \]

9. Calculate.

a) \(9 \div 3 = \_ \_ \_ \)  

b) \(20 \div 4 = \_ \_ \_ \)

c) \(25 \div 5 = \_ \_ \_ \)  

d) \(12 \div 3 = \_ \_ \_ \)

e) \(5 \div 1 = \_ \_ \_ \)  

f) \(8 \div 4 = \_ \_ \_ \)

g) \(8 \div 2 = \_ \_ \_ \)

h) \(10 \div 5 = \_ \_ \_ \)

10. Write a division sentence for each.

a) 20 cookies shared by 5 people

b) 12 toys shared by 4 children
10.1 Exploring Division

GOAL
Solve division problems using models.

Problem
Aneela and Julia are making kaleidoscopes in the Science Club. Each kaleidoscope needs 3 plastic rectangles. Aneela and Julia have 27 plastic rectangles.

How many kaleidoscopes can Aneela and Julia make?

Step 1: They need 3 rectangles for each kaleidoscope. Count by 3s by shading on the 100 chart shown at the right (the 100 chart is only shown up to 50).

Step 2: Count the numbers you have shaded. There are _______ shaded numbers.

Step 3: Use 27 counters to see if the number of shaded squares is the same as the number of groups of 3 you can make.

(Circle) groups of 3. The first group has been circled for you.

Count the number of circled groups.
How many groups of 3 are there? _______

How many kaleidoscopes can Aneela and Julia make? _______
<table>
<thead>
<tr>
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<th>1</th>
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<td>97</td>
<td>98</td>
<td>99</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>
10.1 Exploring Division

You will need
- a 100 chart
  (blackline master)
- counters

**GOAL**
Solve division problems using models.

How many reflectors can Aneela and Julia make so that no rectangles are left over?

**Step 1:** Put a counter on 3 and then on every 3rd square on a hundreds chart.
Stop at 90.

**Step 2:** How many counters did you use from 1 to 70? _______

**Step 3:** How many counters did you use from 71 to 90? _______

**Step 4:** How many reflectors can they make without leftovers?
Explain how you know.

**Step 5:** Show another way you could solve this problem.
Exploring Division

GOAL

Solve division problems using models.

You will need 40 toothpicks, coins, buttons, or something else to use as counters.

1. Use counters to show 40 band members in equal rows. Then sketch the rows.
   a) 2 equal rows
   b) 4 equal rows
   c) 5 equal rows

2. Can 40 band members march in equal rows if they march each way? How do you know?
   a) 6 rows
   b) 7 rows
   c) 8 rows

3. Between 25 and 35 students are working in groups planting trees.
   a) How many students might there be if they are working in groups of 5?
   b) How many students might there be if they are working in groups of 4?
   c) How many students might there be if they are working in groups of 3?

Nelson Math Focus 4
10.2 Relating Division to Multiplication

Student Book page 351

GOAL
Solve division problems by multiplying.

Problem
Some students are packaging spring rolls.
They have 54 spring rolls to put into 6 packages.

How many spring rolls will be in each package?

Step 1: Use multiplication to help you make a prediction.
If there were 10 spring rolls in each package, how many spring rolls
would there be altogether?

10 × 6 = _______

Step 2: Are 10 spring rolls too many or too few? ________________

Step 3: Try fewer spring rolls.
Draw pictures to help you figure out the answer.
10.2 Relating Division to Multiplication

Student Book page 351

GOAL
Solve division problems by multiplying.

How can you multiply to decide how many packages each student should pack?

Step 1: Put a counter on 6 and then on every 6th square on a 100 chart.
Stop at 90.

Step 2: There are _______ groups of 6 in 90.

$90 \div 6 = _______$

Use multiplication to double check.

$6 \times _______ = 90$

Step 3: There are 5 students.
Use multiplication to figure out how many packages each of them gets.

$5 \times _______ = _______$

Hint: Use your answer from Step 2.

Step 5: Show another way you could solve this problem.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
Relating Division to Multiplication

**GOAL**
Solve division problems by multiplying.

1. Use each multiplication sentence to complete each division sentence.
   a) \(3 \times 8 = 24\), so \(24 \div 3 = \) ______
   b) \(9 \times 8 = 72\), so \(72 \div 8 = \) ______
   c) \(5 \times 12 = 60\), so \(60 \div 5 = \) ______
   d) \(2 \times 11 = 22\), so \(22 \div 2 = \) ______
   e) \(13 \times 6 = 78\), so \(78 \div 6 = \) ______
   f) \(4 \times 17 = 68\), so \(68 \div 4 = \) ______

2. Use multiplication to complete each division sentence.
   a) \(72 \div 4 = \) ______
      \(4 \times 15 = \) ______
      \(4 \times 16 = \) ______
      \(4 \times 17 = \) ______
      \(4 \times 18 = \) ______
   b) \(80 \div 5 = \) ______
      \(5 \times 12 = \) ______
      \(5 \times 13 = \) ______
      \(5 \times 14 = \) ______
      \(5 \times 15 = \) ______
      \(5 \times 16 = \) ______

3. Kate put 80 cookies into 5 equal groups.
   How many cookies are in each group? Explain your thinking.
10.3 Using Subtraction to Divide Page 1

Student Book pages 352–355

GOAL
Solve division problems by subtracting.

Problem
Kate is making decorations for a banquet.
She is tying balloons together in bunches of 4.
She has 36 balloons.

How many bunches of balloons can Kate make?

Step 1: Use a number line to keep track of all the bunches of balloons.
Start at 36.
Subtract 4 balloons to show each bundle.

\[
\begin{align*}
\text{Step 2: Count how many bundles can be made.} \\
\text{Hint: You can count the bumps on your number line.}
\end{align*}
\]
Step 3: Check your work.

Draw a picture that shows 36 balloons in bundles of 4.

Reflecting

How does knowing subtraction help you to divide?

________________________

________________________

________________________

________________________

________________________
10.3 Using Subtraction to Divide Page 1

Student Book pages 352–355

GOAL
Solve division problems by subtracting.

You will need
• a number line

Checking

1. Kate has 99 balloons to put in bunches of 6.

   a) First make 10 bunches of 6.
      That's 60 balloons.

      \[ \begin{array}{c}
      6) 99 \\
      - 60 \\
      \hline
      39
      \end{array} \]

      10 bunches

      How many are left? \underline{39} balloons

      Take away 5 bunches of 6.
      That's 30 balloons

      \[ \begin{array}{c}
      6) 99 \\
      - 60 \\
      \hline
      - 30
      \end{array} \]

      5 bunches

      How many are left? \underline{30} balloons

      How many more bunches of 6 can you take away?
      Show your work.

      \[ \underline{10} + \underline{5} + \underline{1} = \underline{16} \]

   b) How many balloons will be left over? \underline{33}
10.3 Using Subtraction to Divide Page 2

Practising

2. Kate has 62 balloons to put in bunches of 5.
   First, make 10 bunches of 5.
   That's _______ balloons.

   \[ \begin{array}{c}
   5 \longdiv{62} \\
   \underline{-50} \\
   12 \\
   \end{array} \]
   10 bunches

   How many are left? _______ balloons

   How many more bunches of 5 can you take away?
   Show your work.

   \[ \begin{array}{c}
   10 + \underline{4} = \underline{14} \\
   \end{array} \]

   How many are left now? _______ balloons

   How many bunches can Kate make in all?

   10 + _______ = _______

   b) How many balloons will be left over? _______

6. Olena cut out the dough for 51 perogies.
   She cut out 3 circles in each row of the dough.
   How many rows were there?
   Show your work.

   \[ \begin{array}{c}
   3 \longdiv{51} \\
   \underline{-3} \\
   3 \\
   \end{array} \]

   There were _______ rows.
2. Kate has 62 balloons to put in bunches of 5.
   a) How many bunches can she make?
      Use a number line to divide 62 by 5.

      First make 10 bunches of 5. That uses 50 balloons.
      \[
      \begin{array}{c|c}
      5 & 62 \\
      - & 50 \\
      \hline
      -12 & 10 \text{ bunches} \\
      \end{array}
      \]
      \[
      \begin{array}{c|c}
      5 & 12 \\
      - & 10 \\
      \hline
      -2 & 2 \text{ bunches} \\
      \end{array}
      \]

      How many are left? _______ balloons
      How many more bunches of 5 can you take away? _______ bunches
      How many are left now? _______ balloons
      How many bunches can Kate make? _______ bunches

   b) How many balloons will be left over? _______ balloons
Using Subtraction to Divide

GOAL
Solve division problems by subtracting.

1. Joshua was putting 102 muffins in packages of 8 muffins each. To find out how many packages he needed, he divided.

\[
\begin{array}{c|c|c}
8 & \text{)102} & \\
-80 & & 10 \\
22 & & I need at least 10 packages. \\
-16 & 2 & I need 2 more packages. \\
6 & & I have 6 muffins left. \\
\end{array}
\]

I need \(10 + 2 = 12\) packages.
I have 6 muffins left over.

a) How many muffins did Joshua have?

b) How many muffins were left over after the muffins were put in packages?

c) How did Joshua know that he needed at least 10 packages?

At-Home Help
The remainder is the amount left over after a number is divided into a whole number of equal parts.
For example: \(44 \div 7 = 6 \text{ R2}\)
You can use subtraction to help you divide greater numbers. For example:
What is \(102 \div 8\)?
I know that \(80 \div 8 = 10\), so \(102 \div 8\) must be more than 10.
I will subtract to see how many more are needed.
(See Question 1 for the rest of the solution.)

2. Use subtraction to divide. Show your steps.

a) \(4\overline{49}\)  

b) \(7\overline{85}\)  

c) \(3\overline{39}\)  

d) \(6\overline{98}\)
10.4 Dividing By Renaming Page 1
Student Book pages 356–357

GOAL
Divide by renaming the dividend.

Problem
Lang and Aneela both collect postcards.
Lang has 3 times as many postcards as Aneela.

If Lang has 36 postcards, how many postcards does Aneela have?

Step 1: You have to calculate $36 \div 3$.
Use base ten blocks to show the number 36.
There are 3 tens blocks and 6 ones blocks.

Step 2: Divide the tens blocks into 3 rows.
There are 3 tens blocks.
$3 \times 10 = 30$
$30 \div 3 = 10$
Put 1 tens block in each row.

Step 3: Divide the ones blocks into 3 rows.
There are 6 ones blocks
$6 \times 1 = _____$
$6 \div 3 = _____$
Put _____ ones blocks in each row.
10.4 Dividing By Renaming Page 2

Step 4: 36 can be shown as 3 rows of 1 tens block and 2 ones blocks.

36

You can rename the dividend 36 as 30 + 6.

36 ÷ 3 is the same as 30 ÷ 3 added to 6 ÷ 3.

36 ÷ 3 = 30 ÷ 3 + 6 ÷ 3

36 ÷ 3 = _______ + _______

36 ÷ 3 = _______

Aneela has _______ postcards.

Reflecting

How did renaming the dividend help you to divide 36 by 3?

_____________________________________________________________________________

_____________________________________________________________________________

_____________________________________________________________________________
10.4 Dividing by Renaming Page 1
Student Book pages 356–357

GOAL
Divide by renaming the dividend.

Checking

1. Tracy and Aaron both collect hockey cards.
   Tracy has 4 times as many cards as Aaron.
   Tracy has 92 cards.

a) Write the division expression for the problem.

   \[ \_\_\_\_\_\_\_\_\_\_\_\_ \div \_\_\_\_\_\_\_\_\_\_\_\_ \]

b) Model 92 with 8 tens blocks and 12 ones blocks.
   Draw the blocks below.

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

8 tens is ________.
12 ones is ________.
92 can be renamed as ________ + ________.

c) \[92 \div 4 = \_\_\_\_\_\_\_\_\_\_\_\_ \div 4 + \_\_\_\_\_\_\_\_\_\_\_\_ \div 4\]
   \[= \_\_\_\_\_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_\_\_\_\]
   \[= \_\_\_\_\_\_\_\_\_\_\_\_\]

Aaron has ________ cards.
10.4 Dividing by Renaming Page 2

Practising

3. Divide by renaming. Explain your strategy for one division.

a) \(75 = \underline{\quad} + \underline{\quad}\)
\[
75 \div 5 = \underline{\quad} \div 5 + \underline{\quad} \div 5
\]
\[
R \underline{\quad} \\
= \underline{\quad} + \underline{\quad}
\]
\[
= \underline{\quad}
\]

\(5)\overline{75} = \underline{\quad}\)

b) \(58 = \underline{\quad} + \underline{\quad}\)
\[
58 \div 4 = \underline{\quad} \div 4 + \underline{\quad} \div 4
\]
\[
R \underline{\quad} \\
= \underline{\quad} + \underline{\quad} R \underline{\quad}
\]
\[
= \underline{\quad} R \underline{\quad}
\]

\(4)\overline{58} = \underline{\quad} R \underline{\quad}\)

c) \(92 = \underline{\quad} + \underline{\quad}\)
\[
92 \div 7 = \underline{\quad} \div 7 + \underline{\quad} \div 7
\]
\[
R \underline{\quad} \\
= \underline{\quad} + \underline{\quad} R \underline{\quad}
\]
\[
= \underline{\quad} R \underline{\quad}
\]

\(7)\overline{92} = \underline{\quad} R \underline{\quad}\)

d) \(94 = \underline{\quad} + \underline{\quad}\)
\[
94 \div 9 = \underline{\quad} \div 9 + \underline{\quad} \div 9
\]
\[
R \underline{\quad} \\
= \underline{\quad} + \underline{\quad} R \underline{\quad}
\]
\[
= \underline{\quad} R \underline{\quad}
\]

\(9)\overline{94} = \underline{\quad} R \underline{\quad}\)
WORD PROBLEM

Max is putting eggs into cartons. He has 27 eggs. Each carton holds 6 eggs. How many cartons will he fill? Will there be any eggs left over?

BASICS BOX:

Sometimes when we divide we don't end up with completely equal groups. We have extras or leftovers. These extras are called the remainder.

Max has 27 eggs. If he puts them in containers of 6, it would look like this.

We see he can fill 4 cartons, but he will have 3 extra eggs.

\[ \frac{4}{3} \quad \rightarrow \text{This is how we write the remainder.} \]

Remember: The remainder should always be less than the divisor.

PRACTICE:

Find the quotients.

1. \( 4 \div 23 \)
2. \( 5 \div 27 \)
3. \( 6 \div 47 \)
4. \( 2 \div 13 \)
5. \( 4 \div 15 \)
6. \( 3 \div 26 \)
7. \( 8 \div 79 \)
8. \( 4 \div 29 \)

JOURNAL

List and explain all the steps for dividing 17 by 3.
Dividing by Renaming

1. Jade wants to calculate 39 ÷ 3.
   Fill in the blanks to complete her solution.
   I will rename 39 as _______ + _______.
   I will divide each new number by 3.
   _______ ÷ 3 = _______
   _______ ÷ 3 = _______
   I will calculate 39 ÷ 3 = _______ + _______ = _______

2. To calculate 63 ÷ 3, rename 63 as _______ + _______.
   Make sure both new numbers can be divided by 3.
   _______ ÷ 3 = _______
   _______ ÷ 3 = _______
   63 ÷ 3 = _______

3. Divide by renaming. Show your steps.
   a) 28 ÷ 2        b) 45 ÷ 3
   c) 56 ÷ 4

At-Home Help
The dividend is the number you divide into parts.
For example: 8 ÷ 4 = 2
   dividend
You can divide by renaming the dividend.
For example:
What is 72 ÷ 4?
I will rename 72 as 60 ÷ 12.
72 ÷ 4 is the same as 60 ÷ 4 added to 12 ÷ 4.
60 ÷ 4 = 15
12 ÷ 4 = 3
15 + 3 = 18, so 72 ÷ 4 = 18

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10.5 Estimating Quotients Page 1

GOAL

Use multiplication and division facts to estimate quotients.

Problem

Julie wants to read the book *Sarah, Plain and Tall* in 3 days.
The book has 58 pages.
She wants to read about the same number of pages every night.

About how many pages will Julia read each night?

Step 1: Think about how many pages Julia would read if she read 10 pages for 3 nights.

\[10 \times 3 = \underline{_____}\]

You know Julia will read more than 10 pages each night.

Step 2: Think about how many pages Julia would read if she read 20 pages each night.

\[20 \times 3 = \underline{_____}\]

You know Julia will read less than 20 pages each night.

Step 3: Think of an easier number that you could use to divide.
58 is close to 60.

\[60 \div 3 = \underline{_____}\]

Hint: Use the number line to help you.
You know that Julia will read more than 10 pages each night. And you know that Julia will read less than 20 pages each night. About how many pages do you estimate she will read each night? Explain your thinking.

reflecting
How did thinking about easier numbers help you to estimate?

Why might it be helpful for Julia to think of 58 as 6 tens?
Estimate by rounding the dividends to the nearest ten or hundreds. Then do the division.

\[
\begin{array}{ccc}
3 & \overline{747} & 3 & \overline{750} & 5 & \overline{695} \\
\end{array}
\]

\[
\begin{array}{ccc}
8 & \overline{792} & 6 & \overline{906} \\
\end{array}
\]

\[
\begin{array}{ccc}
686 + 7 = \underline{\quad} & \text{estimate} & \underline{\quad} + \underline{\quad} = \underline{\quad} \\
326 + 2 = \underline{\quad} & \text{estimate} & \underline{\quad} + \underline{\quad} = \underline{\quad} \\
788 + 4 = \underline{\quad} & \text{estimate} & \underline{\quad} + \underline{\quad} = \underline{\quad} \\
915 + 5 = \underline{\quad} & \text{estimate} & \underline{\quad} + \underline{\quad} = \underline{\quad} \\
294 + 6 = \underline{\quad} & \text{estimate} & \underline{\quad} + \underline{\quad} = \underline{\quad} \\
416 + 8 = \underline{\quad} & \text{estimate} & \underline{\quad} + \underline{\quad} = \underline{\quad} \\
567 + 3 = \underline{\quad} & \text{estimate} & \underline{\quad} + \underline{\quad} = \underline{\quad} \\
891 + 9 = \underline{\quad} & \text{estimate} & \underline{\quad} + \underline{\quad} = \underline{\quad} \\
\end{array}
\]
Estimating Quotients

GOAL
Use multiplication and division facts to estimate quotients.

1. Write a fact that is useful to solve the division problem.
   a) I want to know $80 \div 4$. I know ________
   b) I want to know $60 \div 2$. I know ________
   c) I want to know $100 \div 5$. I know ________

2. Tien wants to estimate the quotient for $88 \div 3$.
   She says, "$88$ is close to $90$. I know that $9 \div 3 = 3$.”
   Use Tien’s fact to estimate the quotient.

3. Lang wants to estimate the quotient for $43 \div 9$.
   He says, "$43$ is close to $45$. I can divide $45$ into $9$ equal parts.” Use Lang’s fact to estimate the quotient.

4. Estimate each quotient.
   a) $33 \div 8$
   b) $25 \div 6$
   c) $80 \div 9$

At-Home Help
The **quotient** is the answer to a division problem.
For example: $8 \div 4 = 2$

You can use facts you know to estimate the quotient. For example:
What is $58 \div 3$?
$58$ is close to $60$. It is easier to divide $60 \div 3$ than $58 \div 3$.
I know $6 \div 3 = 2$, so $60 \div 3 = 20$.
$58 \div 3$ is close to $60 \div 3 = 20$, so the quotient is about $20$. 
Estimating Quotients

GOAL

Use multiplication and division facts to estimate quotients.

1. Write a fact that is useful to solve the division problem.
   a) I want to know $80 \div 4$. I know ________
   b) I want to know $60 \div 2$. I know ________
   c) I want to know $100 \div 5$. I know ________

2. Tien wants to estimate the quotient for $88 \div 3$. She says, “$88$ is close to $90$. I know that $9 \div 3 = 3$.” Use Tien’s fact to estimate the quotient.

3. Lang wants to estimate the quotient for $43 \div 9$. He says, “$43$ is close to $45$. I can divide $45$ into $9$ equal parts.” Use Lang’s fact to estimate the quotient.

4. Estimate each quotient.
   a) $33 \div 8$
   b) $25 \div 6$
   c) $80 \div 9$

At-Home Help

The quotient is the answer to a division problem.

For example: $8 \div 4 = 2$

You can use facts you know to estimate the quotient. For example:

What is $58 \div 3$?
58 is close to 60. It is easier to divide $60 \div 3$ than $58 \div 3$.
I know $6 \div 3 = 2$, so $60 \div 3 = 20$.
$58 \div 3$ is close to $60 \div 3 = 20$, so the quotient is about 20.
Estimate by rounding the dividends to the nearest ten or hundred. Then do the division.

\[
\begin{array}{c}
\boxed{5} \quad 200 \\
3 \quad \boxed{747}
\end{array}
\]

\[
\begin{array}{c}
\boxed{6} \quad 200 \\
3 \quad \boxed{750}
\end{array}
\]

\[
\begin{array}{c}
\boxed{7} \quad 100 \\
5 \quad \boxed{695}
\end{array}
\]

\[
\begin{array}{c}
\boxed{8} \quad 100 \\
5 \quad \boxed{650}
\end{array}
\]

\[
\begin{array}{c}
\boxed{10} \quad 8 \quad \boxed{792}
\end{array}
\]

\[
\begin{array}{c}
\boxed{12} \quad 6 \quad \boxed{906}
\end{array}
\]

13. \[686 \div 7 = \_\] \[\text{estimate} \quad \_\_\_\_\_ \quad + \quad \_\_\_\_\_\_ = \_\_\_\_\_\_\]

14. \[326 \div 2 = \_\] \[\text{estimate} \quad \_\_\_\_\_ \quad \div \quad \_\_\_\_\_\_ = \_\_\_\_\_\_\]

15. \[788 \div 4 = \_\] \[\text{estimate} \quad \_\_\_\_\_ \quad + \quad \_\_\_\_\_\_ = \_\_\_\_\_\_\]

16. \[915 \div 5 = \_\] \[\text{estimate} \quad \_\_\_\_\_ \quad + \quad \_\_\_\_\_\_ = \_\_\_\_\_\_\]

17. \[294 \div 6 = \_\] \[\text{estimate} \quad \_\_\_\_\_ \quad + \quad \_\_\_\_\_\_ = \_\_\_\_\_\_\]

18. \[416 \div 8 = \_\] \[\text{estimate} \quad \_\_\_\_\_ \quad + \quad \_\_\_\_\_\_ = \_\_\_\_\_\_\]

19. \[567 \div 3 = \_\] \[\text{estimate} \quad \_\_\_\_\_ \quad + \quad \_\_\_\_\_\_ = \_\_\_\_\_\_\]

20. \[891 \div 9 = \_\] \[\text{estimate} \quad \_\_\_\_\_ \quad + \quad \_\_\_\_\_\_ = \_\_\_\_\_\_\]
10.6 Dividing by Sharing Page 1
Student Book pages 364–366

GOAL
Solve division problems using base ten blocks.

Problem
Cole has 44 fishing lures.
He plans to give them to his 4 uncles.
He wants to give the same number of fishing lures to each uncle.

How many fishing lures will each uncle get?

Step 1: You need to divide 44 by 4.
Use base 10 blocks to show the number 44.

Step 2: There are 4 tens.

So Cole can give at least 10 lures to each of his uncles.

Step 3: There are 4 more lures to share.
Show how Cole could share the 4 lures.
10.6 Dividing by Sharing Page 2

Step 4: Answer the question.

How many lures can Cole give to each of his uncles?

Reflecting

How is this method like other division methods you know?

How is it different?

How can you use multiplying to check your answer?
10.6 Dividing by Sharing Page 1

Student Book pages 364–366

GOAL
Solve division problems using base ten blocks.

Checking

1. The people in 6 fishing boats caught 72 fish.
   Each boat caught the same amount of fish.

   a) How many fish did each boat catch?

      Step 1: Model 72 fish with base ten blocks.
      _______ tens _______ ones
      \[6 \div 72\]
      \[10\]
      \[6 \div 72\]
      \[-60\]
      \[12\]

      Step 2: Divide the tens in 6 equal groups.
      Draw the groups below.

      How many tens are in each group? _______

      Step 3: How many tens are left over? _______
      Regroup the leftover tens into ones.
      How many ones are there in total? _______
      Divide the ones into 6 equal groups.
      Draw the groups below.
10.6 Dividing by Sharing  Page 2

How many ones are in each group? ______
How many tens and ones are in each group? ______ tens ______ ones
Each boat caught ______ fish.

b) How would the answer change if there had been 75 fish?
   
   Hint: 75 \(-\) 72 = 3.

Practising

4. The video store has 85 cartoon DVDs for rent.
   They are displayed in 5 sections.

a) What division sentence would you use to figure out how many DVDs are in each section?

   ______ \(\div\) ______ = ______

b) Solve the division problem.
   
   Hint: Use base ten blocks to share the DVDs.
   
   Explain your solution.

   ______________________________________________________
   ______________________________________________________
   
   There are ______ DVDs in each section.

c) How do you know your answer is reasonable?

   ______________________________________________________
   ______________________________________________________
4. The video store has 85 cartoon DVDs for rent. They are displayed in 5 sections with about the same number of DVDs in each section.

a) What equation can you use to figure out how many DVDs are in each section?

\[
\frac{\text{total number of DVDs}}{\text{number of sections}} = \text{number of DVDs in each section}
\]

b) Solve your equation.

How many equal groups will you put the DVDs into? __________

How many DVDs are in each group? __________

Do you have any DVDs left over? __________

c) Is your answer reasonable? How do you know?

Hint: Check by multiplying.
Dividing by Sharing

You will need pennies and dimes to use as ones and tens.

1. Use pennies and dimes to model $64 \div 3$.
   Divide the coins into 3 equal groups.

   How many dimes are in each group? __________
   How many pennies are in each group? __________
   What is left over? __________
   $64 \div 3 = _______ R _______

2. Calculate.
   a) $35 \div 3 = _______ R _______
   b) $71 \div 5 = _______ R _______
   c) $29 \div 2 = _______ R _______
   d) $41 \div 7 = _______ R _______
   e) $55 \div 4 = _______ R _______
   f) $92 \div 3 = _______ R _______

3. 5 people share 68 strawberries equally.
   A few strawberries are left over.
   a) What equation can you use to figure out how many strawberries each person eats? __________
   b) Solve your equation.
2. A number is divided by 3. The remainder is 1.
   When the quotient without the remainder is divided by 5, the remainder is 2.
   What might the original number be?

**Understand the Problem**
The number has a remainder of _____ when you divide by ______.
The quotient (answer) without the remainder divided by 5 has a remainder of _____.

**Make a Plan**
I will try _____________________________

_____________________________

**Carry Out the Plan**
Show the numbers you guessed and tested.

__________________________________________________________

The original number might be _______.

3. Use only odd numbers for all the missing digits to make this division calculation true.

```
  [ ] [ ]
- [ ] [ ]
```

**Hint:** Odd numbers end with 1, 3, 5, 7, and 9.
Show all your work.
10.7 Solving Problems by Guessing and Testing

GOAL
Use guessing and testing to solve problems.

Checking

1. Shilpa was putting samosas into bags.
   When she put them into bags of 6, she had 1 left over.
   When she put them into bags of 8, she had 1 left over.
   How many samosas might she have?

Understand the Problem
I know the number has a remainder of ______ when I divide by ______ and ______.
I need to find out how many samosas Shilpa might have.

Make a Plan
I will try the number ______ first.
Then I will guess and test other numbers.

Carry Out the Plan
Use the number you chose.
   ______ ÷ 6 = ______ R ____
   ______ ÷ 8 = ______ R ____
Did your number fit the clues? ______
If no, guess and test another number. ______
   ______ ÷ 6 = ______ R ____
   ______ ÷ 8 = ______ R ____
Keep on guessing numbers until you find a number that fits the clues.
Remember: Use what you learn from your testing in your new guesses.

Shilpa might have ______ or ______ samosas.
Step 2: Use counters to make groups to show the candies for Aneela and 3 friends.

Show the 1 candy that is left over.

Step 3: Look at your groups.
How can you figure out how many candies Aneela has?

Reflecting
Why was making a model a good strategy for solving this problem?
10.7 Solving Problems by Making a Model

**Goal**
Make a model to solve a problem.

**Problem**
Aneela has some candies to share.
If she shares her candies with 2 friends and herself, they each get 8 candies and there is 1 candy left over.
If she shares her candies with 3 friends and herself, they each get 6 candies and there is 1 candy left over.

**How many candies does Aneela have?**

**Step 1:** Use counters to make groups to show the candies.
Start with showing the candies for Aneela and 2 friends.
The first group is done for you.

Show the 1 candy that is left over.
Solving Problems by Guessing and Testing

**GOAL**

Use guessing and testing to solve problems.

1. Joshua has a mystery number. When he divides his number by 3, the answer is 14 and the remainder is 2. What is the mystery number?

2. Emily has a mystery number between 15 and 20. When she divides her number by 3, the remainder is 2. What is the mystery number?

3. Jade has 66 chairs to arrange for a show. She makes 5 equal rows and has 1 chair left over. How many chairs are in each row?

4. Ken has 87 books to place on 7 shelves. How many more books does he need if he wants an equal number of books on each shelf?

5. Use only even numbers for all the missing digits to make this division calculation true. There is more than one correct answer.

\[
\_ \_ \_ \div \_ \_ \_ = \_ \_ \_ \_ \]
Chapter 10  Test Yourself

Circle the correct answer.

1. Calculate $77 \div 4$.
   
   A. 19 R1       B. 18 R5       C. 20       D. 16 R3

2. Calculate $80 \div 5$.
   
   A. 12       B. 14       C. 16       D. 18

3. What is the missing number in this calculation? $5 \times \frac{3}{2} = 60$
   
   A. 10       B. 12       C. 14       D. 16

4. Jade has 62 bottles of water to pack in boxes of 6. How many bottles will be left over?
   
   A. 2 bottles       B. 4 bottles       C. 6 bottles       D. 10 bottles

5. Which calculation has the greatest remainder?
   
   A. $53 \div 5$       B. $28 \div 3$       C. $86 \div 4$       D. $66 \div 10$

6. Which quotient is about 30?
   
   A. $5\overline{80}$       B. $3\overline{94}$       C. $2\overline{85}$       D. $3\overline{64}$

7. Aneela made 81 invitation cards. She made 3 cards every day. How many days did Aneela make cards?
   
   A. 9 days       B. 18 days       C. 27 days       D. 36 days

8. Matt used between 55 and 60 cards to make an array with 4 rows. He has 3 cards left over. How many cards did he start with?
   
   A. 56       B. 57       C. 58       D. 59
Division: Remainders

Division is a way to find out how many times one number is contained in another number. For example, \(28 \div 4 = 7\) means that there are seven groups of four in 28. The dividend is the larger number that is divided by the smaller number, or divisor. The quotient is the answer in a division problem. The remainder is the amount left over. The remainder is always less than the divisor.

**Directions:** Study the example. Find each quotient and remainder.

**Example:**
There are 11 dog biscuits. Put them in groups of 3. There are 2 left over.

\[
\begin{array}{c|c}
3 & 11 \\
\hline
-9 & 2
\end{array}
\]

**Remember:** The remainder must be less than the divisor!

\[
\begin{array}{c}
3 \left\{ 13 \right. \\
4 \left\{ 17 \right. \\
6 \left\{ 32 \right. \\
5 \left\{ 26 \right.
\end{array}
\]

\[
\begin{align*}
9 \div 4 &= \underline{____} \\
12 \div 5 &= \underline{____} \\
26 \div 4 &= \underline{____} \\
49 \div 9 &= \underline{____}
\end{align*}
\]

The pet store has 7 cats. Two cats go in each cage. How many cats are left over?  __________
Divisibility Rules

A number is divisible:
- by 2 if the last digit is 0 or even (2, 4, 6, 8).
- by 3 if the sum of all digits is divisible by 3.
- by 4 if the last two digits are divisible by 4.
- by 5 if the last digit is a 0 or 5.
- by 10 if the last digit is 0.

Example: 250 is divisible by 2, 5, 10

Directions: Tell what numbers each of these numbers is divisible by.

3,732
50
7,960
104,924

439
444
8,212
2,345
Try some more basic facts with remainders.

**Example:**

If objects left over is called the remainder.

Sometimes when you try to divide a number of objects into groups of equal size, you have some objects left over. The number of objects left over is called the remainder.

Dividing with Remainders

Basic Facts with Remainders
Division: Remainders

Division is a way to find out how many times one number is contained in another number. For example, 28 ÷ 4 = 7 means that there are seven groups of four in 28. The dividend is the larger number that is divided by the smaller number, or divisor. The quotient is the answer in a division problem. The remainder is the amount left over. The remainder is always less than the divisor.

**Directions:** Study the example. Find each quotient and remainder.

**Example:**
There are 11 dog biscuits. Put them in groups of 3. There are 2 left over.

\[
\begin{array}{c}
3 \longdiv{11} \\
\underline{-9} \\
2 \text{ remainder}
\end{array}
\]

**Remember:** The remainder must be less than the divisor.

\[
\begin{array}{c}
3 \longdiv{13} \\
4 \longdiv{17} \\
6 \longdiv{32} \\
5 \longdiv{26}
\end{array}
\]

\[
\begin{align*}
9 + 4 &= \_\_\_ \\
12 + 5 &= \_\_\_ \\
26 + 4 &= \_\_\_ \\
49 + 9 &= \_\_\_
\end{align*}
\]

The pet store has 7 cats. Two cats go in each cage. How many cats are left over?

---

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Everything for Math and Reading
5. How can you use \( 48 = 40 + 8 \) to calculate \( 48 \div 4 \) (? Use expanded form.)

6. Carla has 5 times as many pennies as Jordan. (Use base 10 division) or chunking
   If Carla has 80 pennies, how many does Jordan have?

7. Which quotients are about 10? Explain how you estimated. How your work
   A. \( 6\overline{62} \)  B. \( 3\overline{71} \)  C. \( 5\overline{68} \)  D. \( 9\overline{85} \)

8. Calculate. Check your answers by using multiplication. Show all your work!
   a) \( 87 \div 7 = \)  b) \( 92 \div 8 = \)  c) \( 67 \div 5 = \)  d) \( 75 \div 3 = \)
Chapter 10 Test  Page 1  Grade 4  36

1. How can you use multiplication to solve $57 \div 3$? Give an example.

2. Michael is making paper airplanes with 4 decals on each plane.
   a) If he has 83 decals, how many paper airplanes can he make? Show your work.

   b) How many decals are left over?

3. a) How many jumps of 4 can you make on a number line like this? ________
   Show your work.

   b) What calculation did you represent?
   (what division sentence)

4. Which calculation gives the greatest remainder? Show work for each.
   A. $37 \div 6$  B. $60 \div 8$  C. $43 \div 7$  D. $85 \div 3$