



# Problems with Remainders

Let's think about remainders to solve problems.

## Warm-up

### Number Talk: Dividing by 7

Find the value of each expression mentally.

- $21 \div 7$
- $35 \div 7$
- $140 \div 7$
- $196 \div 7$

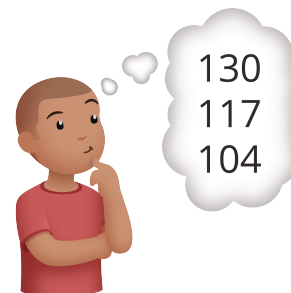


## Activity 1

### Write Multiples

1. Han starts writing multiples of a number. When he reaches 104, he has written 8 numbers.

For each of the following questions, explain or show your reasoning.



- What number is Han writing multiples of?
- What is the 15th multiple of this number?
- Han gets to 286. How many numbers has he written at that point?

2. Kiran wants to know how many multiples of 7 are between 0 and 150.

a. He thinks he can use division to find out. Do you agree? Explain your reasoning.

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b. How many multiples will he find? Show your reasoning.

c. Is 150 a multiple of 7? Show how you know.

3. Han writes the number 295. He is wondering if he made a mistake. Determine if 295 is a multiple of 8 and explain your reasoning.

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## Activity 2

### Jada's Mystery Number

Jada writes multiples of a mystery number. After writing some numbers, she writes the number 126.

- Mai says 6 is the mystery number.
- Priya says 8 is the mystery number.
- Andre says 9 could be the mystery number.

1. Which student do you agree with? Show how you know using equations.

2. Jada gives one more clue: "If I keep writing multiples, I'll get to 153."

What is the mystery number? Explain or show your reasoning.

## Activity 3

### Watch Your Remainder!

Directions:

- Spin the spinner to get your one-digit divisor.
- Each partner:
  - Use 3–4 cards to create a dividend.
  - Write a multiplication equation to represent the quotient. (For example,  $109 \div 9$  is written as  $(9 \times 12) + 1$  and your score is 1.)
  - Check your partner's work to make sure you agree.
  - Your score for each round is the remainder.
- Take new cards so that you have 4 cards to start the next round.
- The partner who has the fewest points once the recording sheet is full wins the game.



## Section C Summary

We solved different problems that involved dividing whole numbers.

We recalled two ways of thinking about division.

For example, if  $274 \div 8$  represents a situation where 274 markers are put into equal groups. The value of  $274 \div 8$  can tell us:

- How many markers are in each group if there were 8 groups.
- How many groups can be made if there were 8 markers in each group.

We learned that in  $274 \div 8$ , the 274 is called the **dividend**, and the 8 is called the **divisor**. We then identified many ways to find the value of a **quotient** —or the result of the division. For  $274 \div 8$ , we can:

- Think about whether one number is a multiple or factor of another number. For example, “Is 274 a multiple of 8?” or “Is 8 a factor of 274?”
- Divide by place value and think about putting 2 hundred, 7 tens, and 4 ones into 8 equal groups.
- Divide in parts and find partial quotients. For example, we can first find  $160 \div 8$  (which is 20), and then  $80 \div 8$  (which is 10), and then  $32 \div 8$  (which is 4).
- Think in terms of multiplication. For example, we can think of  $8 \times 20 = 160$ ,  $8 \times 10 = 80$ , and so on.

Here is one way to record division using partial quotients.

$$\begin{array}{r} \boxed{34} \\ 4 \\ 10 \\ 20 \\ 8 \overline{)274} \\ - 160 \\ \hline 114 \\ - 80 \\ \hline 34 \\ - 32 \\ \hline 2 \end{array} \quad \begin{array}{l} \\ \\ \\ \\ 8 \times 20 \\ \\ 8 \times 10 \\ \\ 8 \times 4 \end{array}$$

Sometimes a division results in a leftover that can't be put into equal groups or is not enough to make a new group. We call the leftover a **remainder**. Dividing 274 by 8 gives 34 and a remainder of 2.