



## Section B: Multi-digit Division Using Partial Quotients

Students begin the work on whole-number division by deepening their understanding of division expressions and the effect that changing the divisor or dividend has on the value of the quotient. In a progression that leads to students engaging in partial-quotients algorithms, students estimate quotients and write partial-quotient equations that match their own methods for finding the value of the quotient. Once they understand that they can find the value of the quotient by decomposing the dividend into multiples of the divisor, students learn to express this decomposition, using equations and then a partial-quotients algorithm.

### Decomposition of the Dividend

$$448 \div 16 = (320 \div 16) + (80 \div 16) + (48 \div 16)$$

$$448 \div 16 = 20 + 5 + 3$$

$$448 \div 16 = 28$$

### A Partial-Quotients Algorithm

$$\begin{array}{r} \boxed{28} \\ 3 \\ 5 \\ 20 \\ 16 \overline{)448} \\ \underline{-320} \quad (20 \times 16) \\ 128 \\ \underline{-80} \quad (5 \times 16) \\ 48 \\ \underline{-48} \quad (3 \times 16) \\ 0 \end{array}$$

## Section C: Let's Put it to Work

Students practice their multiplication and division skills as they solve problems involving volume. They are using the volume formulas ( $V = l \times w \times h$  (volume equals length times width times height) and  $V = b \times h$  (volume equals base area times height)) to practice the multiplication and division work of the previous sections. Students engage with relatively large numbers to multiply and divide using these volume formulas, developing fluency with the standard algorithm for multiplication and the partial-quotients algorithm.

## Try it at home!

Near the end of the unit, ask your fifth grader to solve the following problems:

- $219 \times 52$
- $868 \div 14$

Questions that may be helpful as they work:

- Can you draw a diagram to help you solve the problem?
- Can you explain the steps of your algorithm?

Solution:

- 11,388
- 62

Sample response:

- A partial-products area diagram that solves the expression  $219 \times 52$ .
- First, I multiplied 14 by 60 to get 840. Then, I subtracted:  $868 - 840 = 28$ . I know that  $14 \times 2 = 28$ . I subtracted 28 from 28 to get 0. Then, I added my partial quotients:  $60 + 2 = 62$ .