

Grade 4 Unit 6

Lesson 9

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Unit 6 Lesson 9: Recording Partial Products: One-digit and Three- or Four-digit Factors

WU Which One Doesn't Belong: Expressions Galore (Warm up)

Student Task Statement

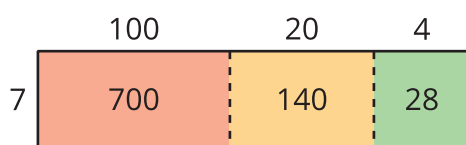
Which one doesn't belong?

- A. 7×50
- B. $(3 \times 50) + (4 \times 50)$
- C. $(5 \times 10) \times 7$
- D. $50 + 50 + 50 + 50 + 50 + 50 + 50$

1 An Algorithm for Noah

Student Task Statement

- Noah drew a diagram and wrote expressions to show his thinking as he multiplied two numbers.



$$\begin{aligned}
 &7 \times 124 \\
 &7 \times (100 + 20 + 4) \\
 &(7 \times 100) + (7 \times 20) + (7 \times 4) \\
 &700 + 140 + 28
 \end{aligned}$$

$$700 + 140 + 28 = 868$$

How does each expression represent Noah's diagram? Be prepared to share your thinking with a partner.

- Later, Noah learned another way to record the multiplication, as shown here.

Step 1

$$\begin{array}{r}
 \times \quad 1 \ 2 \ 4 \\
 \hline
 \quad \quad 2 \ 8
 \end{array}
 \quad 7 \times 4$$

Step 2

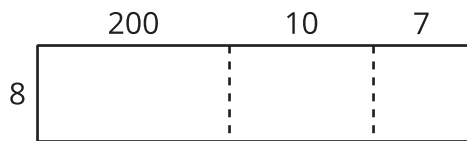
$$\begin{array}{r}
 \times \quad 1 \ 2 \ 4 \\
 \hline
 \quad \quad 2 \ 8 \\
 1 \ 4 \ 0
 \end{array}
 \quad \begin{array}{l} 7 \times 4 \\ 7 \times 20 \end{array}$$

Step 3

$$\begin{array}{r}
 124 \\
 \times 7 \\
 \hline
 28 \\
 140 \\
 + 700 \\
 \hline
 868
 \end{array}
 \quad
 \begin{array}{l}
 7 \times 4 \\
 7 \times 20 \\
 7 \times 100
 \end{array}$$

Make sense of each step of the calculations and record your thoughts. Be prepared to explain Noah's steps to a partner.

3. Complete the diagram to find the value of 217×8 . Use Noah's recording method to check your work.



$$\begin{array}{r}
 217 \\
 \times 8 \\
 \hline
 \\
 \\
 + \underline{\hspace{2cm}}
 \end{array}
 \quad
 \begin{array}{l}
 8 \times 7 \\
 8 \times 10 \\
 8 \times 200
 \end{array}$$

Activity Synthesis

$$\begin{array}{r}
 124 \\
 \times 7 \\
 \hline
 28 \\
 140 \\
 + 700 \\
 \hline
 868
 \end{array}$$

2 Try an Algorithm with Partial Products

Student Task Statement

Noah and Mai want to find the value of $8 \times 3,419$. They recorded their steps in different ways, as shown.

Noah

$$\begin{array}{r}
 3,419 \\
 \times 8 \\
 \hline
 72 \\
 80 \\
 3,200 \\
 + 24,000 \\
 \hline
 \end{array}$$

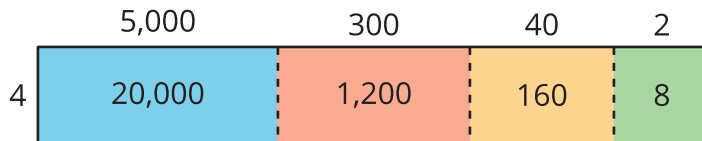
Mai

$$\begin{array}{r}
 3,419 \\
 \times 8 \\
 \hline
 24,000 \\
 3,200 \\
 80 \\
 + 72 \\
 \hline
 \end{array}$$

1. How are Mai's and Noah's notation alike? How are they different?

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2. Use a diagram to show what each of the partial products 72, 80, 3,200 and 24,000 represent. Then, find the value of $8 \times 3,419$.
 3. Find the value of each expression. For at least one expression, use the algorithm that Noah used. Show your reasoning.
 - a. $4 \times 5,342$
 - b. 7×983

Images for Activity Synthesis



$$20,000 + 1,200 + 160 + 8 = 21,368$$

$$\begin{array}{r}
 , \\
 , \\
 \times , \\
 \hline
 , \\
 , \\
 , \\
 + , \\
 \hline
 2 ,
 \end{array}$$