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

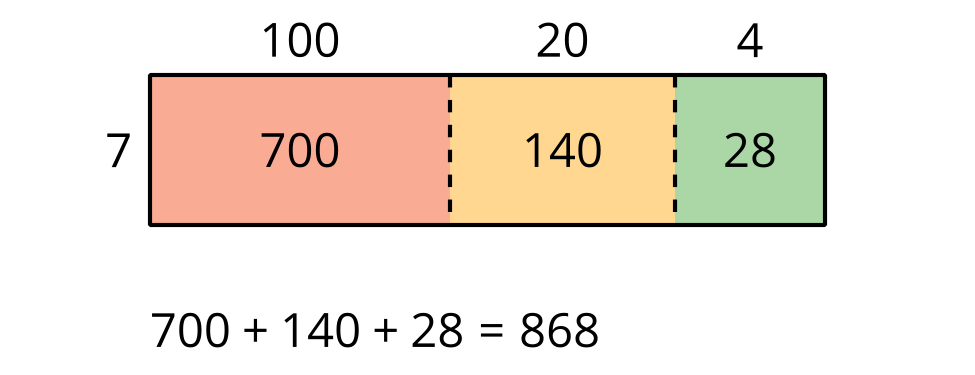
* Let’s analyze and try an algorithm that uses partial products.

### Warm-up: Which One Doesn’t Belong: Expressions Galore

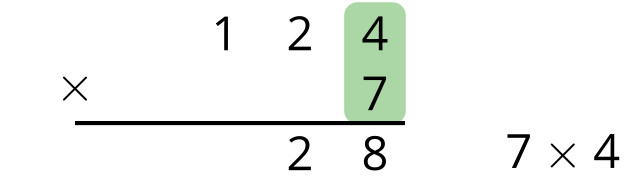
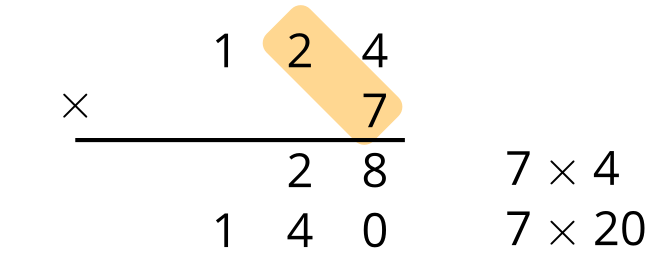
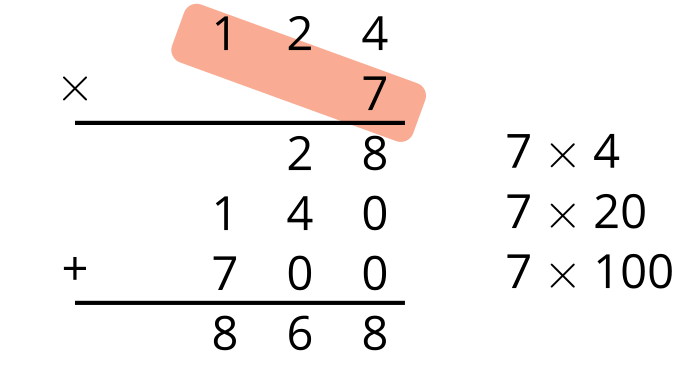
Which one doesn’t belong?

### 9.1: An Algorithm for Noah

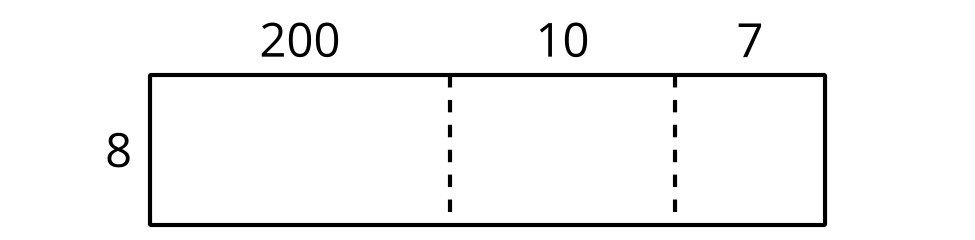
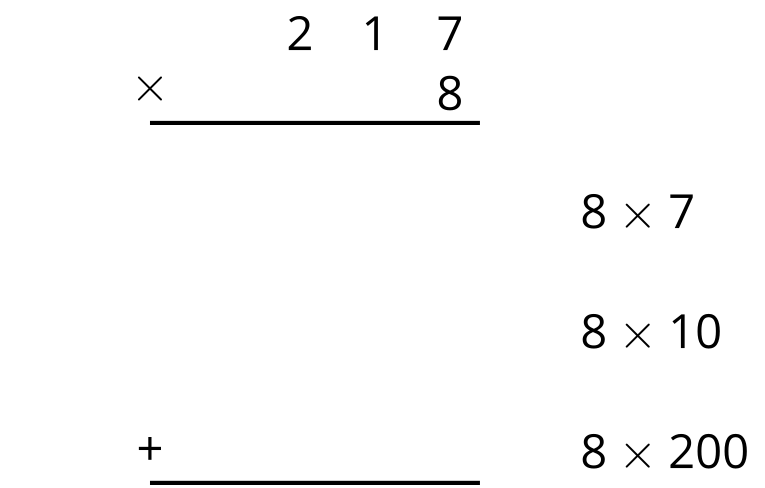
1. Noah drew a diagram and wrote expressions to show his thinking as he multiplied two numbers.

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

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

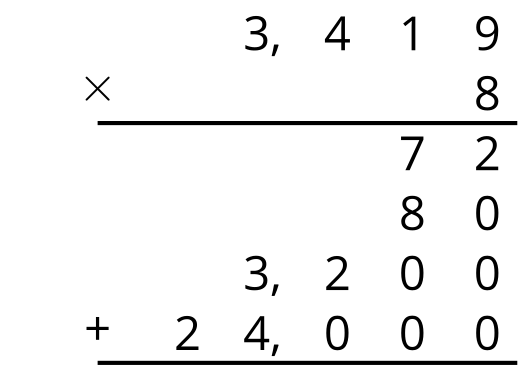
* Step 1
* Step 2
* Step 3
* Make sense of each step of the calculations and record your thoughts. Be prepared to explain Noah’s steps to a partner.

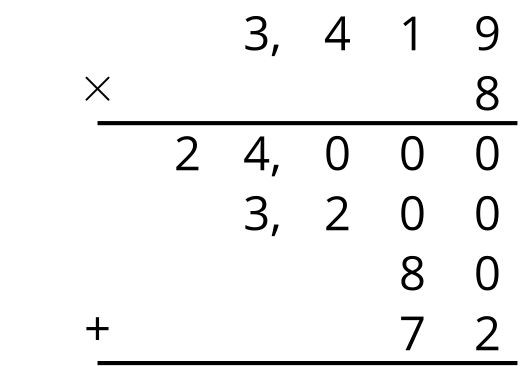
1. Complete the diagram to find the value of . Use Noah’s recording method to check your work.

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### 9.2: Try an Algorithm with Partial Products

Noah and Mai want to find the value of . They recorded their steps in different ways, as shown.

Noah

Mai

1. How are Mai’s and Noah’s notation alike? How are they different?
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 .
3. Find the value of each expression. For at least one expression, use the algorithm that Noah used. Show your reasoning.



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