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Multiplying with Tens

Solve each problem.

1. Juice boxes come in cases of 24. A school ordered 480 juice boxes. How many cases of juice boxes did the school order?
2. John has 630 baseball cards. He sorts the cards into stacks of 30 cards. How many stacks can he make?

20 cases

21 stacks

3. A bank received a supply of 2,000 quarters. Each roll of quarters has 40 quarters in it. How many rolls of quarters did the bank receive?
4. There are 10 tickets in each strip of carnival tickets. A total of 3,850 tickets were sold in one day. How many strips of tickets were sold that day?

50 rolls

385 strips of tickets

5.  **Explain** what strategy you used to solve Problem 3.

Possible explanation: I wrote the equation

$40 \times n = 2,000$, and worked backward to find 50.

I used $4 \times n = 20$. I know 4×5 is 20, so $40 \times 50 = 2,000$.

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Decode the Message

Use rounding to estimate the greatest product in each exercise. Then write the letter of the correct answer above its place in the letter puzzle below. For example, the letter of the greatest product from Exercise 1 goes above Blank 1. The first one has been done for you.

- | | | | | | |
|-------|----------------|---|----------------|---|----------------|
| 1. A | 42×50 | E | 33×64 | T | 48×56 |
| 2. A | 12×15 | B | 11×14 | C | 10×13 |
| 3. J | 91×24 | O | 89×33 | P | 82×31 |
| 4. K | 78×46 | R | 74×48 | E | 79×55 |
| 5. A | 45×32 | I | 48×39 | R | 43×34 |
| 6. I | 25×26 | E | 23×27 | Y | 22×27 |
| 7. T | 50×48 | W | 56×42 | B | 51×44 |
| 8. T | 34×62 | R | 32×69 | S | 37×65 |
| 9. N | 88×72 | P | 67×70 | M | 91×64 |
| 10. D | 43×53 | H | 42×56 | M | 42×61 |

What is a great way to evaluate the reasonableness of an answer?

<u>E</u>	<u>S</u>	<u>T</u>	<u>I</u>	<u>M</u>	<u>A</u>	<u>T</u>	<u>I</u>	<u>O</u>	<u>N</u>
4.	8.	7.	5.	10.	2.	1.	6.	3.	9.

11.  **Write Math** For Exercise 10, how did you use estimation to decide which was the greatest product?

Possible answer: I rounded to find the estimated products $40 \times 50 = 2,000$, $40 \times 60 = 2,400$, and $40 \times 60 = 2,400$. Then I compared the factors in the second and third problems.

12. **Stretch Your Thinking** How could you estimate the product 253×93 ? **Explain.**

Possible explanation: I would round 253 to the nearest hundred and round 93 to the nearest ten. $300 \times 90 = 27,000$.

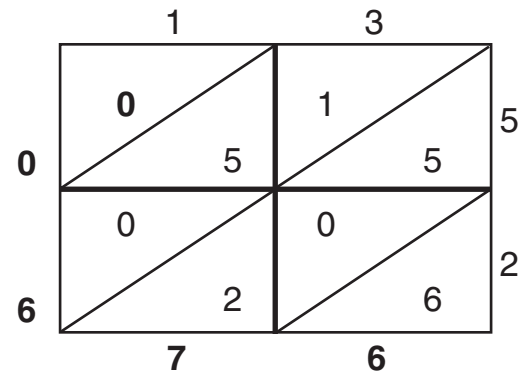
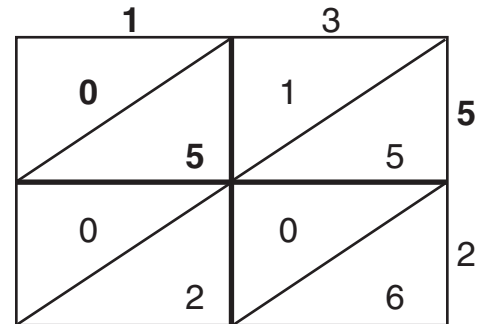
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The Lattice Method

Among the earliest methods of multiplication is the lattice method.

Multiply. 13×52

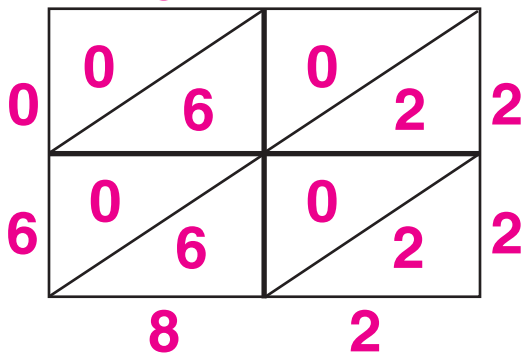
- Write one factor along the top of the lattice and the other factor along the right side.
- Multiply each digit of the factors. Record the products inside the lattice so the ones and tens are separated by a diagonal.
- Add the numbers in the grid along the diagonals, starting from the lower right corner. Record each sum at the end of its diagonal just as you do when adding columns.
- Read the digits down the left and across the bottom. This is the product.



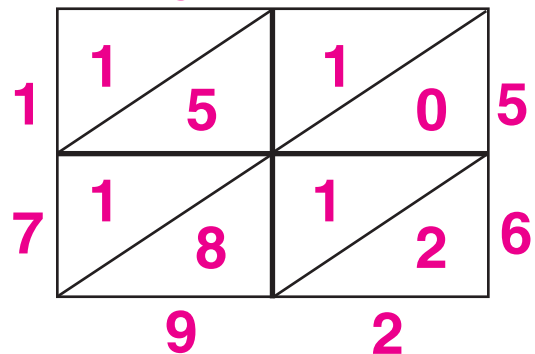
So, $13 \times 52 = 676$.

Use the lattice method to find the product.

1. $31 \times 22 = \underline{\quad 682 \quad}$



2. $32 \times 56 = \underline{\quad 1,792 \quad}$



3. **Write Math** How does the lattice method use partial products to multiply?

Possible answer: In the second step, you find all the partial products of the two factors. In the third step, you add the thousands, hundreds, tens, and ones to find the final product.

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Reverse and Record

When Nestor records 2-digit by 2-digit multiplication, he always records the partial products in the following order:

- (1) Multiply the tens by the tens.
- (2) Multiply the ones by the tens.
- (3) Multiply the tens by the ones.
- (4) Multiply the ones by the ones.

One day he decides to reverse the order. He starts by multiplying the ones by the ones and works backward to multiplying the tens by the tens. He uses this strategy to multiply some numbers. Will Nestor's strategy give him the correct products?

Use Nestor's new strategy to find the products below. The first problem has been completed for you.

<p>1.</p> $\begin{array}{r} 57 \\ \times 35 \\ \hline 35 \\ 250 \\ 210 \\ + 1,500 \\ \hline 1,995 \end{array}$	<p>2.</p> $\begin{array}{r} 31 \\ \times 22 \\ \hline 2 \\ 60 \\ 20 \\ + 600 \\ \hline 682 \end{array}$	<p>3.</p> $\begin{array}{r} 44 \\ \times 63 \\ \hline 12 \\ 120 \\ 240 \\ + 2,400 \\ \hline 2,772 \end{array}$
<p>4.</p> $\begin{array}{r} 75 \\ \times 27 \\ \hline 35 \\ 490 \\ 100 \\ + 1,400 \\ \hline 2,025 \end{array}$	<p>5.</p> $\begin{array}{r} 83 \\ \times 19 \\ \hline 27 \\ 720 \\ 30 \\ + 800 \\ \hline 1,577 \end{array}$	<p>6.</p> $\begin{array}{r} 59 \\ \times 95 \\ \hline 45 \\ 250 \\ 810 \\ + 4,500 \\ \hline 5,605 \end{array}$

7. **Stretch Your Thinking** How can Nestor check that his products are correct?

Possible answer: Nestor can multiply again in the original order of the tens by the tens, the ones by the tens, the tens by the ones, and the ones by the ones to check the products.

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Multiplication Mystery

Write the multiplication problem represented by the partial products. Then write the product.

1. $800 + 280 + 60 + 21$

2. $600 + 40 + 180 + 12$

$$\underline{43 \times 27 = 1,161}$$

$$\underline{26 \times 32 = 832}$$

3. $2,000 + 280 + 300 + 42$

4. $3,600 + 300 + 300 + 25$

$$\underline{46 \times 57 = 2,622}$$


$$\underline{65 \times 65 = 4,225}$$

5. $2,100 + 560 + 0 + 0$

6. $7,200 + 270 + 320 + 12$

$$\underline{70 \times 38 = 2,660}$$

$$\underline{94 \times 83 = 7,802}$$

7.  **Write Math** Which exercise did you find the most difficult to solve? **Explain.**

Possible explanation: Exercise 6, because the ones digits could have been 6 and 2 or 4 and 3.

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Product Pairs

Tatum and Elija are doing their homework together. They need to find two problems that have the same product. Help Tatum and Elija finish their homework by finding the product in the first problem. Then find the unknown digit in the second problem that will make the products equal.

1.
$$\begin{array}{r} 34 \\ \times 15 \\ \hline 510 \end{array}$$

$$\begin{array}{r} 30 \\ \times 1 \boxed{7} \\ \hline \end{array}$$

2.
$$\begin{array}{r} 46 \\ \times 25 \\ \hline 1,150 \end{array}$$

$$\begin{array}{r} 50 \\ \times 2 \boxed{3} \\ \hline \end{array}$$

3.
$$\begin{array}{r} 54 \\ \times 39 \\ \hline 2,106 \end{array}$$

$$\begin{array}{r} 81 \\ \times 2 \boxed{6} \\ \hline \end{array}$$

4.
$$\begin{array}{r} 75 \\ \times 27 \\ \hline 2,025 \end{array}$$

$$\begin{array}{r} 45 \\ \times 4 \boxed{5} \\ \hline \end{array}$$

5.
$$\begin{array}{r} 44 \\ \times 32 \\ \hline 1,408 \end{array}$$

$$\begin{array}{r} 88 \\ \times 1 \boxed{6} \\ \hline \end{array}$$

6.
$$\begin{array}{r} 90 \\ \times 24 \\ \hline 2,160 \end{array}$$

$$\begin{array}{r} 80 \\ \times 2 \boxed{7} \\ \hline \end{array}$$

7.
$$\begin{array}{r} 64 \\ \times 49 \\ \hline 3,136 \end{array}$$

$$\begin{array}{r} 56 \\ \times 5 \boxed{6} \\ \hline \end{array}$$

8.
$$\begin{array}{r} 38 \\ \times 35 \\ \hline 1,330 \end{array}$$

$$\begin{array}{r} 95 \\ \times 1 \boxed{4} \\ \hline \end{array}$$

9. **Stretch Your Thinking** Show two problems that each have two 2-digit factors and the same product.

Possible answer: $45 \times 30 = 1,350$

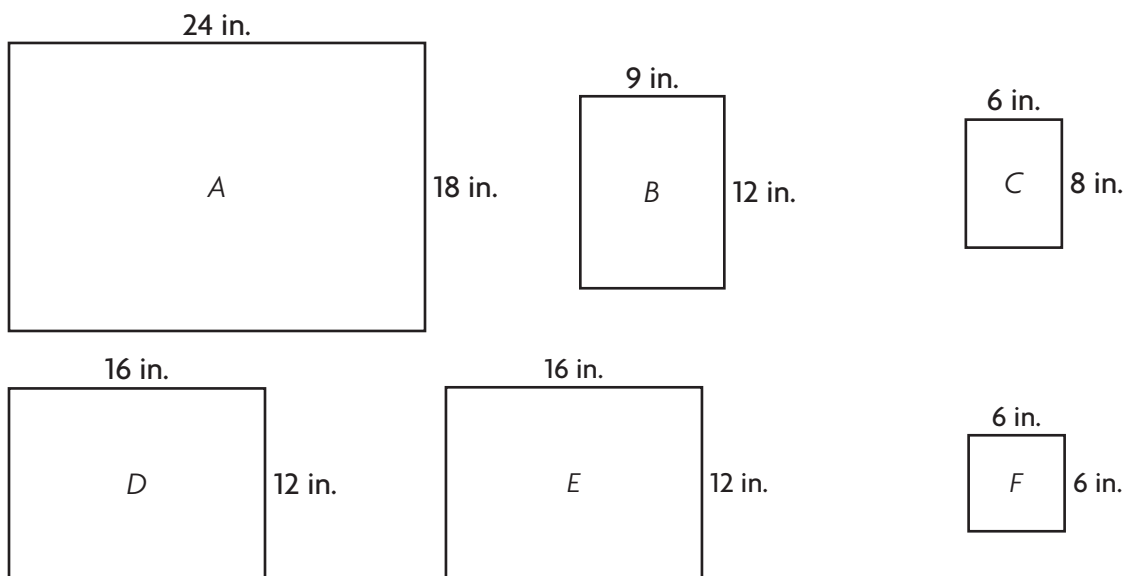
and $27 \times 50 = 1,350$

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Pastry Chef's Problem

A pastry chef is making lemon squares and pumpkin squares for a special event. Here are the facts the chef knows.

- Each square is to measure 1 inch by 1 inch.
 - There are to be an equal number of each type of square.
 - All squares need to be baked at the same time.
 - The chef has only the pans shown below.
1. The chef wants to make the greatest number of squares possible while using only 4 pans. Which pans should the chef choose?



The chef should use pans A, C, D, and E.

The chef will make 432 of each kind of square.

2. **Write Math** **Explain** how you solved the problem.

Possible answer: I found how many squares could be made using pans A, D, and E. Then I found the difference between the number of squares made in pan A and pans D and E. Finally, I found which pan could be used to make the amounts equal (pan C).