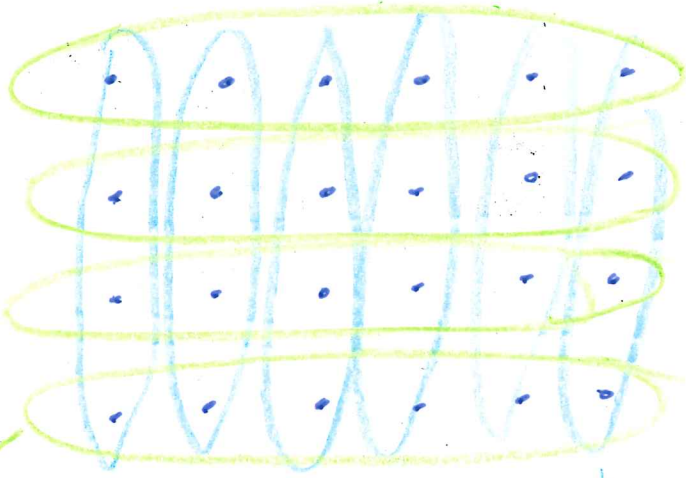


# Commutative Law

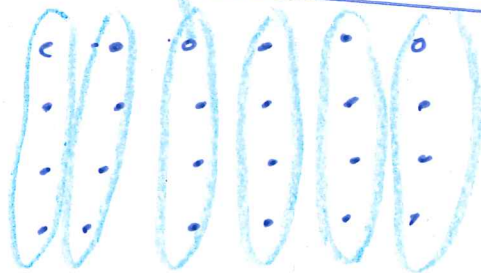
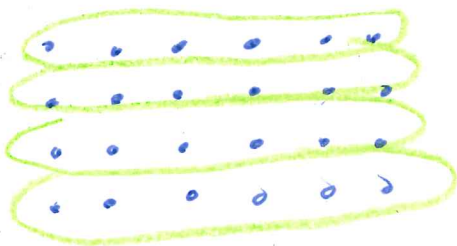
$$4 \times 6 = 6 \times 4$$

Equal because they are two ways of counting the same dots



4 sets of 6

6 sets of 4



equal because both have the same length and width

5. For each word problem, tell your answer, and tell whether the answer is the quotient, the remainder or something else (explain what else it is).

A. 20 pencils are shared between 6 children. How many pencils should each child get?

B. 6 eggs can fit in a small egg carton. I need to put 20 eggs in egg cartons. How many egg cartons do I need?

C. Ms. Jensen has 40 pencils. She wants to put the same number of pencils at each of 6 tables, and she will put any extra pencils away in her drawer. How many pencils will she put in her drawer?

6. Write a division word problem for  $14 \div 4$  where the answer is

A. The quotient

I have 14 cookies  
4 fit on a plate  
How many plates can I fill?

B. The remainder

C. One more than the quotient

How many plates do I need for all of the cookies?



Lattice multiplication

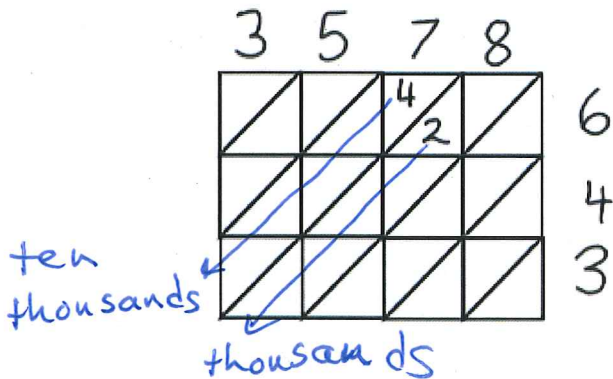
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1. Find the following products using lattice multiplication:

a.  $367 \times 79$

b.  $483 \times 796$

2. In the lattice multiplication problem below,  $7 \times 6 = 42$  goes in the filled in box as shown. What place values do the 4 and the 2 from 42 end up in when they are added into the final product? Explain why those are the right place values for them to be in.



$$70 \times 600 = 42000$$

↑
↑  
ten
thousands  
thousands

4.

$$\begin{array}{r} 560R6 \\ 9 \overline{)4560} \\ \underline{45} \phantom{0} \\ 60 \\ \underline{54} \\ 6 \end{array}$$

$$\begin{array}{r} 730 \\ 8 \overline{)5840} \\ \underline{5600} \\ 240 \\ \underline{240} \end{array}$$

$$\begin{array}{r} 370 \\ 7 \overline{)2149} \\ \underline{21} \phantom{9} \\ 49 \\ \underline{49} \end{array}$$

$$\begin{array}{r} 830 \\ 6 \overline{)4818} \\ \underline{48} \phantom{0} \\ 018 \\ \underline{18} \\ 0 \end{array}$$

$$7 \overline{)3525}$$

Explain the pattern, and why it works or doesn't work.

They are not putting 0 in tens place when you can't take out tens.  
 It doesn't work because 1's number ends up in tens place

5.

$$\begin{array}{r} 44 \\ 2 \overline{)88} \\ \underline{8} \\ 8 \\ \underline{8} \end{array}$$

$$\begin{array}{r} 14 \\ 4 \overline{)164} \\ \underline{16} \phantom{4} \\ 4 \\ \underline{4} \end{array}$$

$$\begin{array}{r} 67 \\ 3 \overline{)228} \\ \underline{21} \phantom{8} \\ 18 \\ \underline{18} \end{array}$$

$$\begin{array}{r} 39 \\ 5 \overline{)465} \\ \underline{45} \phantom{5} \\ 15 \\ \underline{15} \end{array}$$

$$3 \overline{)75}$$

$$7 \overline{)516}$$

Explain the pattern, and why it works or doesn't work.

6.

$$\begin{array}{r} 43R3 \\ 6 \overline{)261} \\ \underline{240} \phantom{1} \\ 21 \\ \underline{12} \\ 9 \\ \underline{6} \\ 3 \end{array} \begin{array}{l} 40 \\ 2 \\ 1 \\ 43 \end{array}$$

$$\begin{array}{r} 236R5 \\ 8 \overline{)1893} \\ \underline{1600} \\ 293 \\ \underline{160} \\ 133 \\ \underline{80} \\ 53 \\ \underline{32} \\ 21 \\ \underline{16} \\ 5 \end{array} \begin{array}{l} 200 \\ 20 \\ 10 \\ 4 \\ 2 \\ 236 \end{array}$$

$$\begin{array}{r} 87R4 \\ 14 \overline{)1222} \\ \underline{1120} \\ 102 \\ \underline{56} \\ 46 \\ \underline{28} \\ 18 \\ \underline{14} \\ 4 \end{array} \begin{array}{l} 80 \\ 4 \\ 2 \\ 1 \\ 87 \end{array}$$

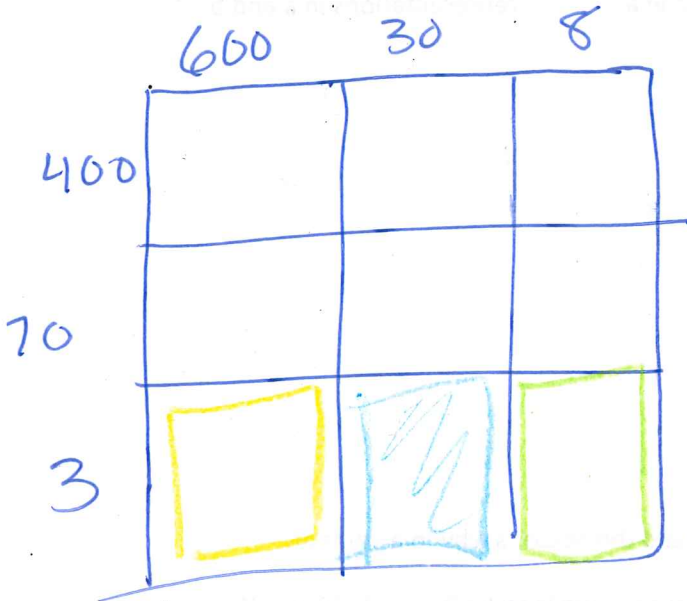
$$7 \overline{)441}$$

Explain the pattern, and why it works or doesn't work.

3. For the product:

$$\begin{array}{r} 638 \\ \times 473 \\ \hline \end{array}$$

a. Sketch a by-hand (non-proportional) array diagram for the product.



b. Write out the solution using the expanded algorithm. Show how the partial products in the expanded algorithm correspond to the parts of the diagram in a

$$\begin{array}{r} 638 \\ \times 473 \\ \hline 18000 \\ 42000 \\ 3200 \\ 12000 \\ \hline 240000 \end{array}$$

c. Write out the solution using the standard algorithm. Show (by color coding or labelling) how the numbers in the standard algorithm correspond to the representations in a and b.

$$\begin{array}{r} 638 \\ \times 473 \\ \hline 1914 \\ 44660 \\ 256200 \\ \hline \end{array}$$

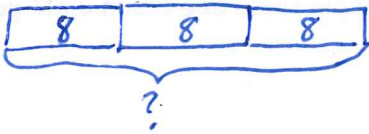
$$\begin{array}{r} 532 \\ -178 \\ \hline 354 \end{array} \quad \leftarrow \quad \begin{array}{r} 400 \\ -500 \\ -100 \\ \hline 300 \end{array} + \begin{array}{r} 120 \\ -20 \\ -30 \\ -70 \\ \hline 50 \end{array} + \begin{array}{r} 12 \\ -2 \\ -8 \\ \hline 4 \end{array}$$

4. Show how to add using the Expanded Algorithm for addition:  $439 + 586$

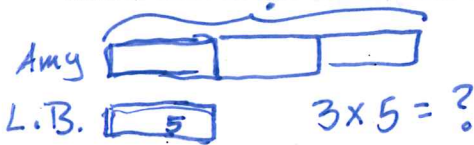
5. Show how to subtract using the Expanded Algorithm for subtraction: a.  $532 - 178$  b.  $703 - 329$

A. There are 8 crayons in each box. Anna has 3 boxes of crayons. How many crayons does she have?

$$3 \times 8 = ?$$



B. Amy's paper chain is 3 times as long as her little brother's paper chain. Her brother's paper chain is 5 ft. long. How long is Amy's paper chain?

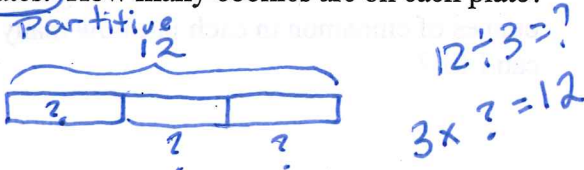


G. Sam walks 3 miles an hour. How many miles can he walk in 4 hours?

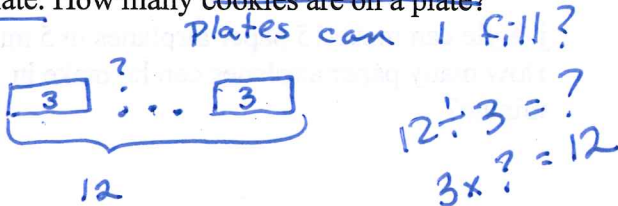
H. The 24 gallons of water in a bathtub drain in 4 minutes. How much water drains in 1 minute?

I. There are 48 ounces of cat food in the bag. If the cat eats 8 ounces of cat food each day, how long will the bag of cat food last?

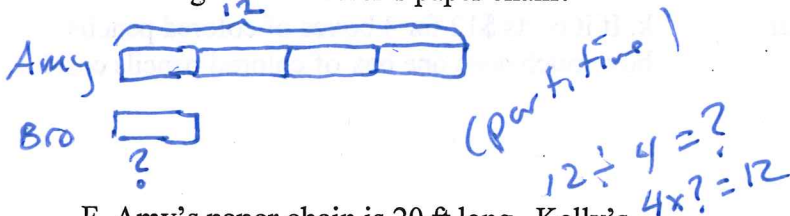
C. I have 12 cookies. I put them evenly on 3 plates. How many cookies are on each plate?



D. I have 12 cookies. I put 3 cookies on each plate. How many cookies are on a plate?



E. Amy's paper chain is 4 times as long as her brother's paper chain. Amy's chain is 12 ft long. How long is her brother's paper chain?



F. Amy's paper chain is 20 ft long. Kelly's paper chain is 4 ft long. How many times longer is Amy's paper chain than Kelly's?

