

Multiplication

Repeated Addition

$$6 + 6 + 6 = 18$$

Standard Algorithm

$$3 \times 6 = 18$$

(3 groups of 6)
(3 times as many as 6)

Partial Product

$$23 \times 42 = ?$$

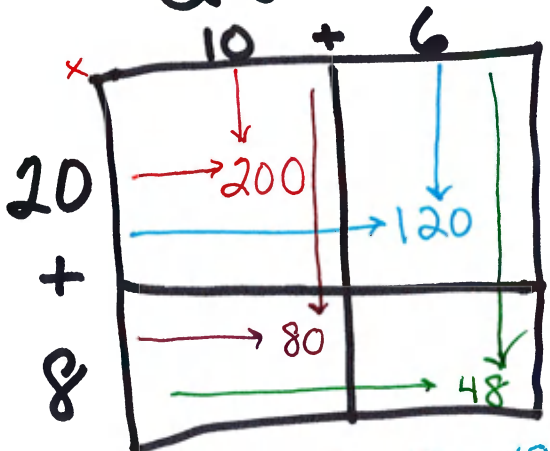
$$(20 \times 40) + (20 \times 2) + (3 \times 40) + (3 \times 2)$$

$$\begin{array}{r} 23 \\ \times 42 \\ \hline \end{array}$$

6 ones \times ones
40 ones \times tens
120 tens \times ones
800 tens \times tens

Area Model

$$28 \times 16 = ?$$



$$200 + 80 + 120 + 48$$

$$280 + 168$$

$$448$$

Break 28 into 20 + 8

Break 16 into 10 + 6

Multiply 20×10

Multiply 20×6

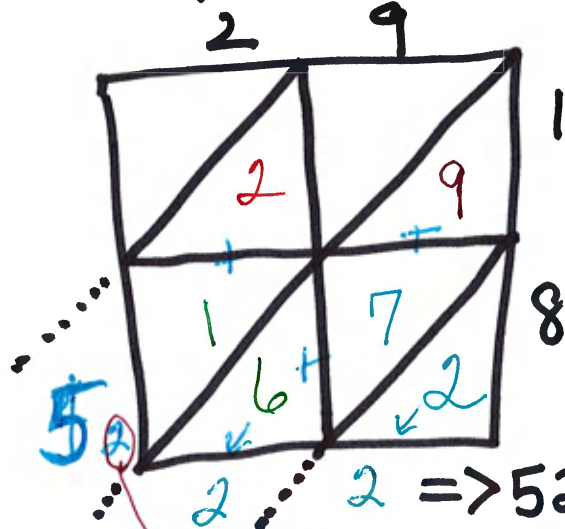
Multiply 8×10

Multiply 8×6

Add them up

Lattice

$$29 \times 18 = ?$$



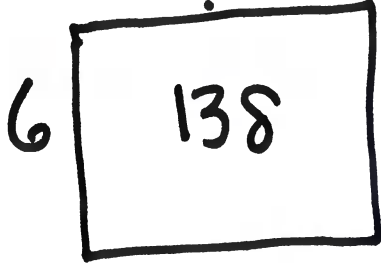
- Step 1: Multiply 1×9
- Step 2: Multiply 8×9
- Step 3: Multiply 1×2
- Step 4: Multiply 8×2

Step 5: Add diagonally
 $2 + 0 = 2$
 $9 + 7 + 6 = 22$
 Regroup
 $2 + 1 + 2 = 5$

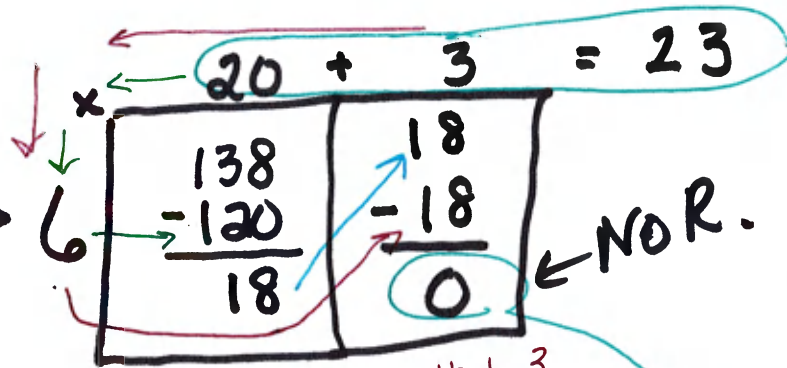
Division

$$138 \div 6 = ?$$

Area Model



\Rightarrow



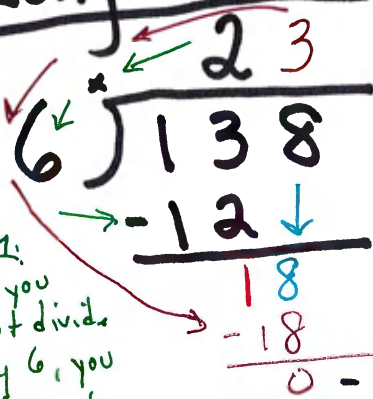
Multiply 20 and 6. This is 120.
 Subtract 120 from 138. The difference is 18. 18 is the new area.

Multiply 3 and 6. This is 18.
 Subtract 18 from 18. The difference is 0.

Put the 18 in the next area box.

Add these up. This is your quotient. Be sure to check for a Remainder. In this case, there isn't any.

Long Division

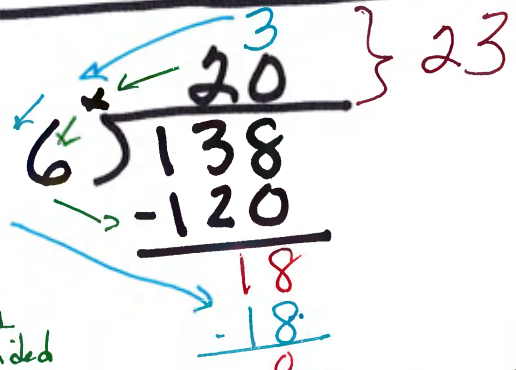


Step 1: Since you cannot divide 1 by 6, you do the next. So, 13 can be divided by 6 -- 2 times.
 Step 2: Subtract 12 from 13, you get 1.

Step 3: Bring the 8 "down." You now have 18.
 Step 4: 3×6 is 18.
 Step 5: subtract 18 from 18.

0 - No Remainder

Partial Quotient



Step 1: 138 divided by 6. You can multiply 20 and 6., you get 120.
 Step 2: Subtract 120 from 138, you get 18.

Step 3: Multiply 3 and 6, you get 18.
 Step 4: subtract 18 from 18, you get 0.

Step 5: Add the partial quotients to get the complete quotient