Lesson 4

Objective: Interpret and represent patterns when multiplying by 10, 100, and 1,000 in arrays and numerically.

Fluency Practice

Rename the Unit

8 tens = 80

9 tens = 90

11 tens = 110

14 tens = 140

14 hundreds = 1,400

14 thousands = 14,000

18 tens = 180

28 tens = 280

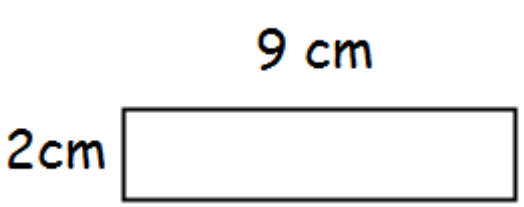
28 hundreds = 2,800

28 thousands = 28,000

Group Count by Multiples of 10 and 100

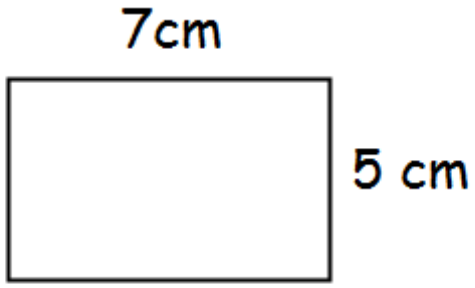
- Count by threes to 30.
- Now count by 3 tens. When I raise my hand, stop counting.
- Count by 4 hundreds
- Count by 6 hundreds

Find the Area and Perimeter



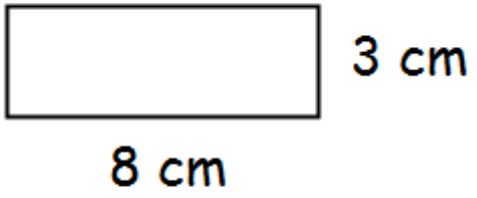
Perimeter= 22cm

Area = 18 sq. cm / cm^2



Perimeter= 24 cm

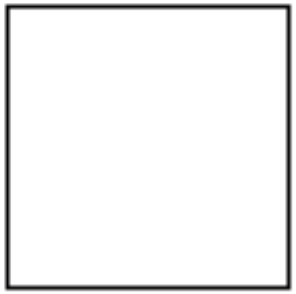
Area = 35 cm^2



Perimeter= 22cm

Area = 24 cm^2

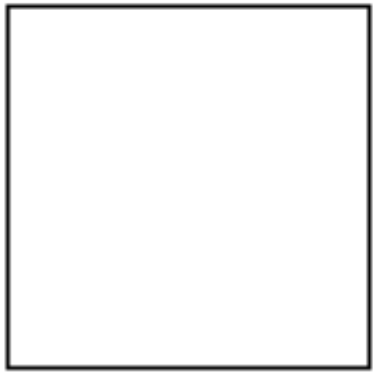
7 cm



7cm

Perimeter = 28 cm

Area = 49 cm^2



8 m

Perimeter = 32 m

Area = 64 m^2

5 cm

x

2 cm

A = 10 sq. cm

A = 35 sq. cm

5 cm

x

7cm

9 m

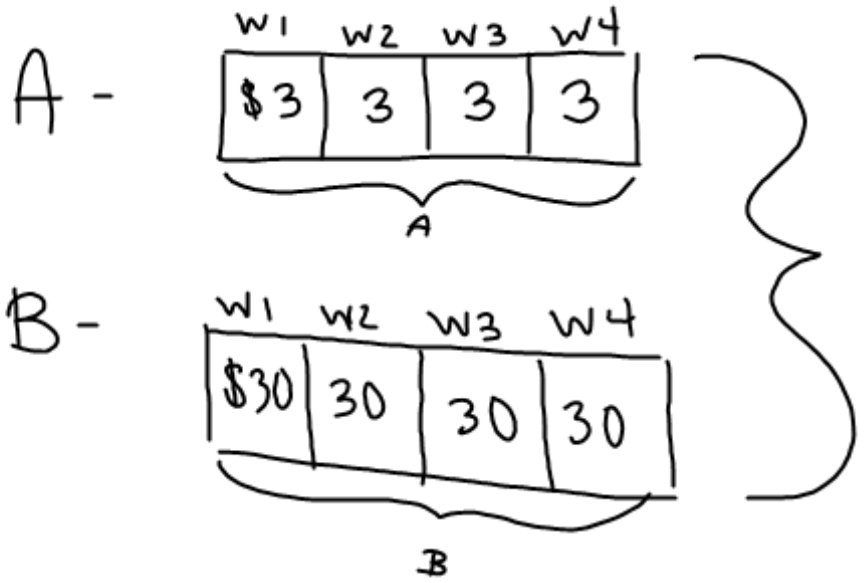
x

A = 54 sq. m

6 m

Application Problem

Samantha received an allowance of $3 every week. By babysitting, she earned $30 every week. How much money did Samantha have in four weeks combining her allowance and her babysitting?



A = $3 x 4 = $12

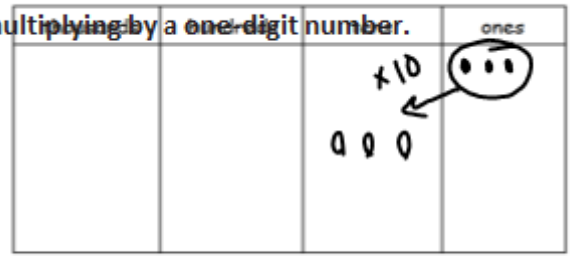
B = $30 x 4 = 12 tens

$120

$120 + 12 = $132

Concept Development

Problem 1: Draw number disks to represent products when multiplying by a one-digit number.



$3 \times 1 = 3$

$3 \times 10 = 3 \text{ tens} = 30$

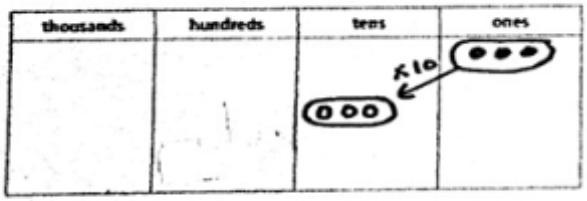
How many ones do you see?

How many groups of 3 ones do you see?

1

Suppose I wanted to multiply 3 ones by ten instead. How would I do that?

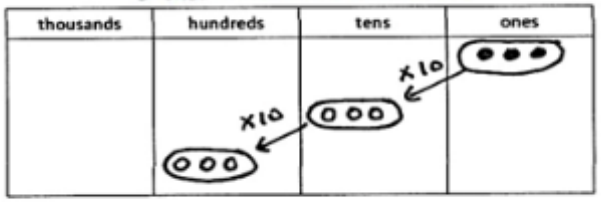
3 ones × 10 = 3 tens



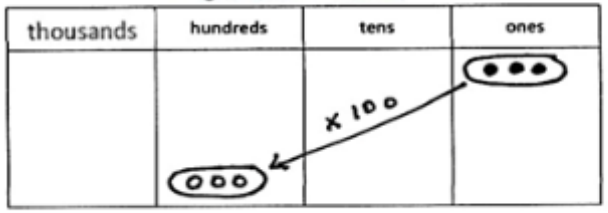
What if I wanted to multiply that by 10?

$3 \times 10 = 30 \times 10 =$

3 ones × 10 × 10 = 3 hundreds



$3 \times 100 = 300$

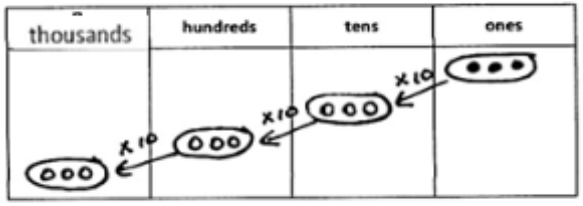


Look at my equation. I started with 3 ones.
What did I multiply 3 ones by to get 3 hundreds?
Turn and talk.

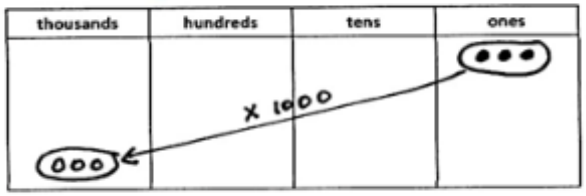
Work with your partner to figure out how to do 3 × 1,000.

What is 3 × 10 × 10 × 10 or 3 × 1,000?

3 ones × 10 × 10 × 10 = 3 thousands



3 × 1000 = 3000



How many ones do you see?

How many groups of 4 ones do you see?

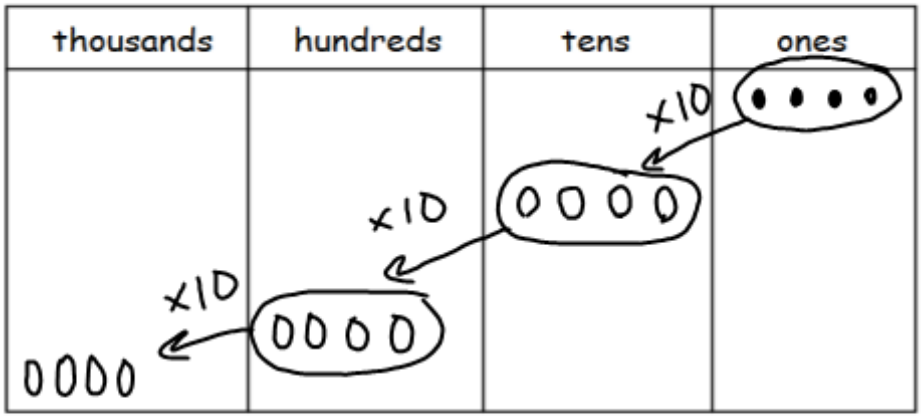
Suppose I wanted to multiply 4 ones by ten instead.
How would I do that?

What if I wanted to multiply that by 10?

Look at my equation. I started with 4 ones.
What did I multiply 4 ones by to get 4 hundreds?
Turn and talk.

Work with your partner to figure out how to do 4 × 1,000.

What is 4 × 10 × 10 × 10 or 4 × 1,000?



$4 \times 1 = 4$ ones

4 ones $\times 10 = 4$ tens

$4 \times 10 = 40$

$4 \times 10 \times 10 = 400$

$4 \times 100 = 400$

$4 \times 10 \times 10 \times 10 = 4{,}000$

$4 \times 1{,}000 = 4{,}000$

Problem 2: Draw number disks to represent products when multiplying by a two-digit number.

15×10

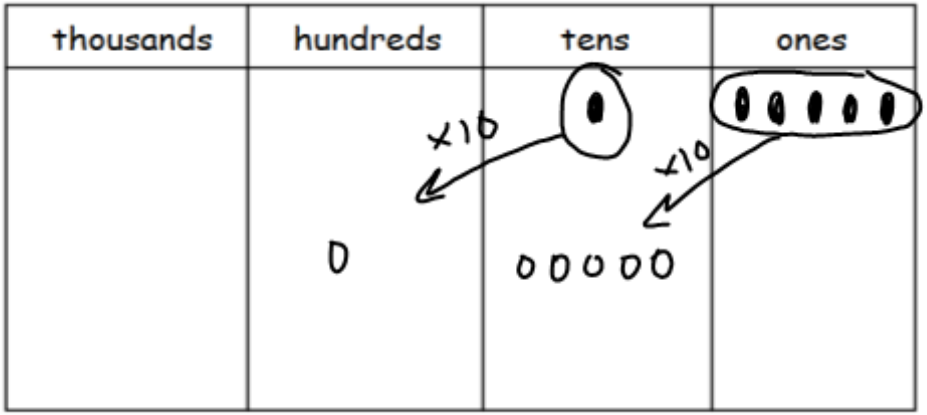
Use number disks to represent 15 and draw 15×10.

We need to show *times 10* for each of our units.

What is 1 ten × 10? 100

What is 5 ones × 10? 50

15 × 10 equals? 150



Display 22×100 on the board.

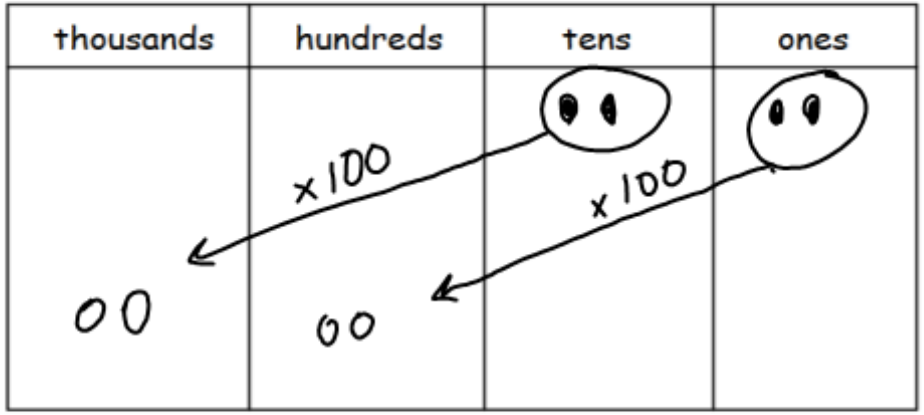
With your partner, represent 22×100 using number disks. How can we express your solution strategies as multiplication sentences?

2 tens × 100 = 2,000

2 ones × 100 = 200

What is 22 × 100?

22 × 100 = 2,200



Problem 3: Decomposing multiples of 10 before multiplying.

Display 4 × 20 on the board.

4 x 20

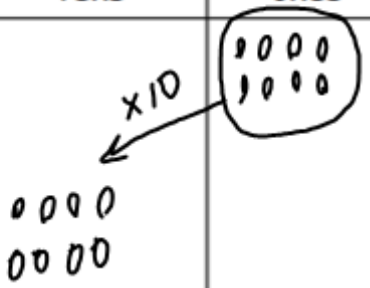
Just like 3 × 100 could be expressed as 3 × 10 × 10, there are different ways to show 4 × 20 to help us multiply.
What is another way that I could express 4 × 20?

Discuss with your partner which of these methods would be most helpful to you to solve 4 × 20.

4 x 2tens

Allow one minute to discuss.

When multiplying with multiples of 10, you can decompose a factor to help you solve. In this example, we expressed 4 × 20 as (4 × 2) × 10.

thousands	hundreds	tens	ones
		x10 	

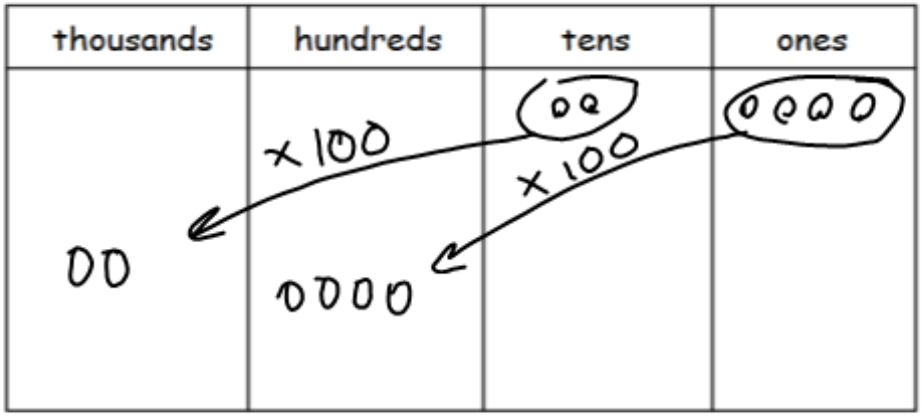
4 x 20 = (4 x 2) x 10

4x20 = 80

6 × 400

(6 × 4) × 100

24 × 100 = 2,400

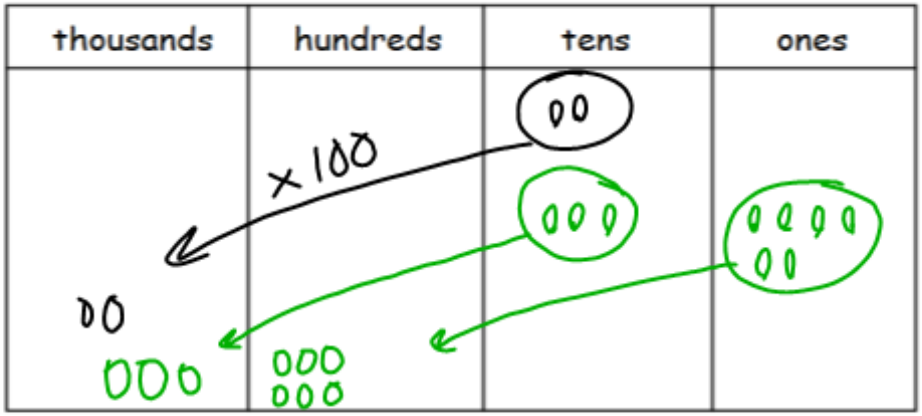


4×500

4 x 5 hundreds

$(4 \times 5) \times 100$

$20 \times 100 = 2,000$



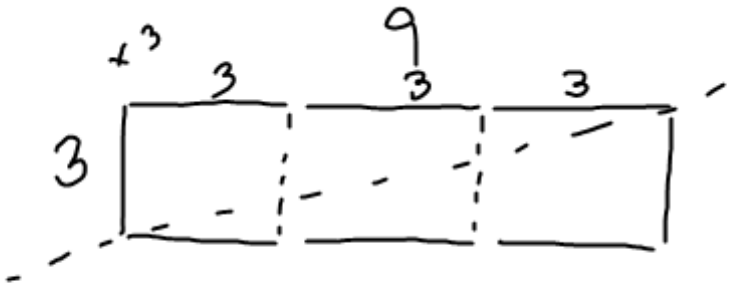
6 x 600

6 x 6 hundreds

$(6 \times 6) \times 100 = 3,600$

1. A poster is 3 times as long as it is wide. A banner is 5 times as long as it is wide. Both the banner and the poster have perimeters of 24 inches. What are the length and width of the poster and the banner?

Poster -

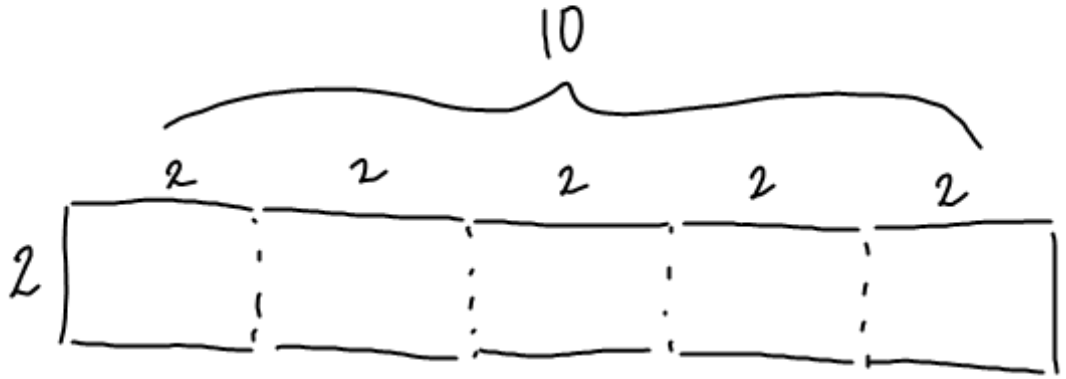


P = 24 in

(L + w) x 2

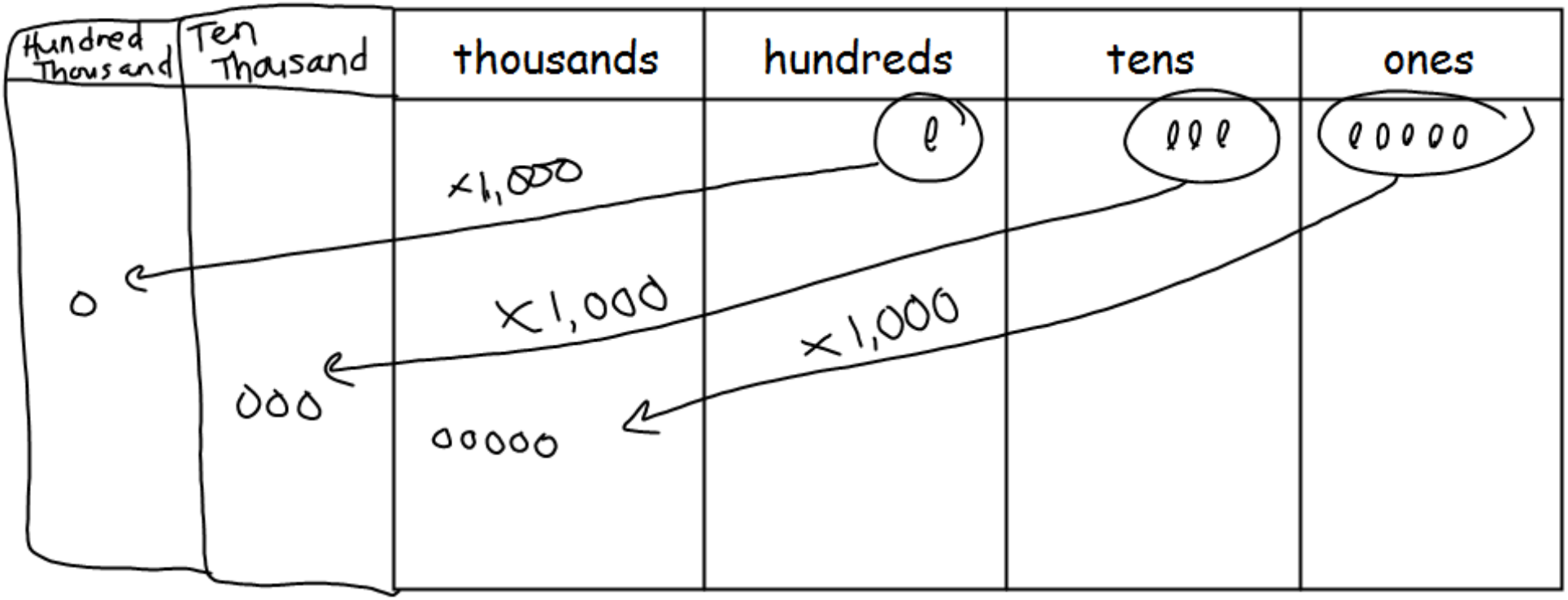
w + L = 12

Banner -



P = 24 in

$135 \times 1{,}000 = 135{,}000$



Name _____ Date _____

Example:

$5 \times 10 =$ 50

5 ones × 10 = 5 tens

thousands	hundreds	tens	ones
		×10 ↓ ○○○○○	●●●●●

Draw number disks and arrows as shown to represent each product.

1. $5 \times 100 =$ 500

$5 \times 10 \times 10 =$ 500

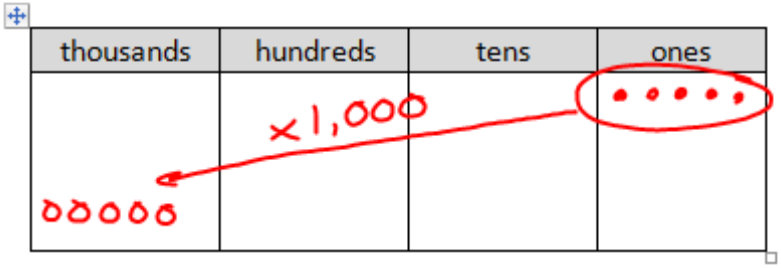
5 ones × 100 = 5 hundreds

thousands	hundreds	tens	ones
	○○○○○	×100 ←	●●●●●

2. $5 \times 1{,}000 =$ 5,000

$5 \times 10 \times 10 \times 10 =$ 5,000

5 ones $\times$ 1,000 = 5 thousands



3. Complete the following equations.

a. $6 \times 10 =$ 60

b. 100 $\times 6 = 600$

c. $6{,}000 =$ 6 $\times 1{,}000$

d. $10 \times 4 =$ 40

e. $4 \times$ 100 $= 400$

f. 1,000 $\times 4 = 4{,}000$

g. $1{,}000 \times 9 =$ 9,000

h. 90 $= 10 \times 9$

i. $900 =$ 9 $\times 100$

Draw number disks and arrows as shown to represent each product.

4. 12 × 10 = 120

(1 ten 2 ones) × 10 = 1 hundred 2 tens

thousands	hundreds	tens	ones
	0	00	

5. 18 × 100 = 1,800

18 × 10 × 10 = 1,800

(1 ten 8 ones) × 100 = 1 thousand 8 hundred

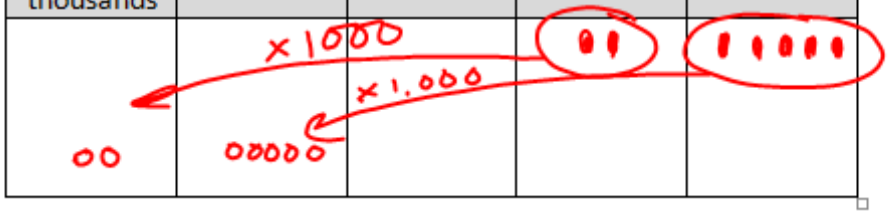
thousands	hundreds	tens	ones
0	0000 0000		

6. $25 \times 1{,}000 =$ 25,000

$25 \times 10 \times 10 \times 10 =$ 25,000

(2 tens 5 ones) × 1,000 = 25 thousands

ten thousands	thousands	hundreds	tens	ones
oo	ooooo		oo	ooooo



Decompose each multiple of 10, 100, or 1,000 before multiplying.

7. $3 \times 40 = 3 \times 4 \times$ 10

$= 12 \times$ 10

= 120

8. $3 \times 200 = 3 \times$ 2 × 100

= 6 × 100

= 600

9. $4 \times 4{,}000 =$ 4 × 4 × 1,000

= 16 × 1,000

= 16,000

10. $5 \times 4{,}000 =$ 5 × 4 × 1,000

= 20 × 1,000

= 20,000

Name _____ Date _____

1. Complete the following equations.

a. $5 \times 10 =$ _____ b. _____ $\times 5 = 500$ c. $5{,}000 =$ _____ $\times 1{,}000$

d. $10 \times 2 =$ _____ e. _____ $\times 20 = 2{,}000$ f. $2{,}000 = 10 \times$ _____

g. $100 \times 18 =$ _____ h. _____ $= 10 \times 32$ i. $4{,}800 =$ _____ $\times 1{,}000$