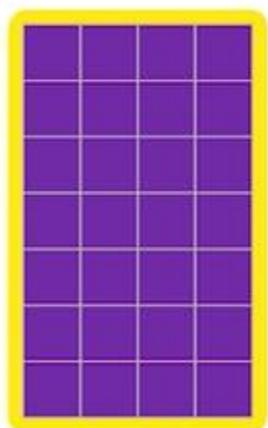# 4th Grade Mission 3 Notes

Perimeter   the boundary around a surface.

Length

width

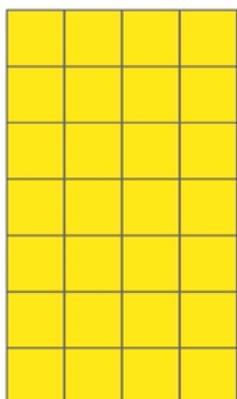### Ways to find the perimeter:

$L + W + L + W$ $7 + 4 + 7 + 4 = 22$

$2L + 2W$ $(2 \times 7) + (2 \times 4) = 14 + 8 = 22$

$2 \times (L + W)$ $2 \times (7 + 4) = 2 \times 11 = 22$

Area   the space a shape takes up.

Length

Width

Ways to find the area:

Count all the squares in the shape (28 sq. units)
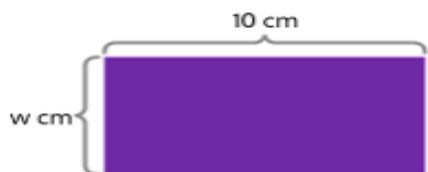
$A = L \times W$ $A = 7 \times 4$

$A = 28$ square units

To find the length of an unknown side when one side and the area is given:

Step 1: Divide the area by the given side. The quotient (answer) is the length of the unknown side.

What is the width of the rectangle?
Area = 50 square cm

10 cm

w cm

Example:

Step 1: 50 sq. cm ÷ 10 cm = 5 cm

w = 5

To find the length of an unknown side when one side and the perimeter is given:
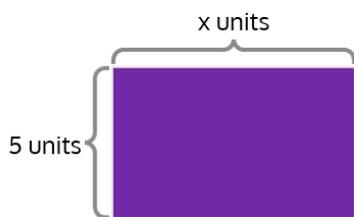
Step 1: Multiply the side given by 2.

Step 2: Subtract the total from step one by the perimeter given.

Step 3: Divide the difference (answer) in step two by 2. The quotient (answer) is the length

of the unknown side.

What is the unknown side length?
Perimeter = 26 units 🔊

x units

Example:
Step 1: 5 units x 2 = 10 units
Step 2: 26 units – 10 units = 16 units
Step 3: 16 units ÷ 2 = 8 units

5 units

x = 8

---

thousands	hundreds	tens	ones
		●	●●●●●
	●	●●●●●	

$15 \times 10 = 1$ hundred 5 tens = 150

4×500

$= 4 \times (5 \times 100)$

$= (4 \times 5) \times 100$

$= 20 \times 100$

$= (2 \times 10) \times 100$

$= 2 \times (10 \times 100)$

$= 2 \times 1,000$

$= 2,000$

4×20

$4 \times (2 \times 10)$

$(4 \times 2) \times 10$

$\quad\; 8 \quad \times 10$

$= 80$

hundreds	tens	ones
		●●●●●●●●
	●●●●●●●●	

ones x tens = tens		
ones x hundreds = hundreds		
ones x thousands = thousands		
tens x tens = hundreds		
tens x hundreds = thousands		
tens x thousands = ten thousands		

Expression	Unit Form	Standard Form
2 ones × 4	8 ones	8
2 tens × 4	8 tens	80
2 hundreds × 4	8 hundreds	800
2 thousands × 4	8 thousands	8000

- When multiplying numbers by multiples of 10 (1, 10, 100, 1000), start by multiplying <u>the basic facts</u> and then <u>adding the number of zeros to the total.</u>
- On a place value chart, we move to the <u>left when multiplying.</u>
- On a place value chart, we move to the <u>right when dividing.</u>

Partial Products
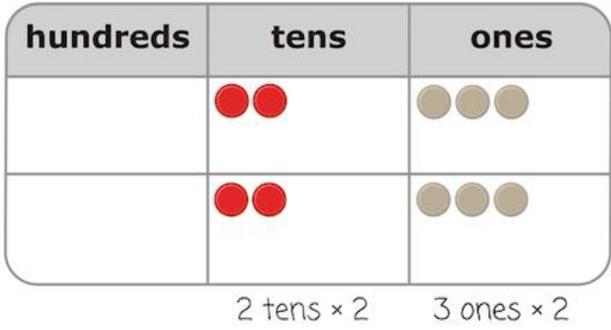
2 tens × 2   3 ones × 2

$$\begin{array}{r} 2\ 3 \\ \times \quad 2 \\ \hline 6 \\ +\ 4\ 0 \\ \hline \end{array}$$

6   3 ones × 2 } Partial
+ 4 0   2 tens × 2 } products
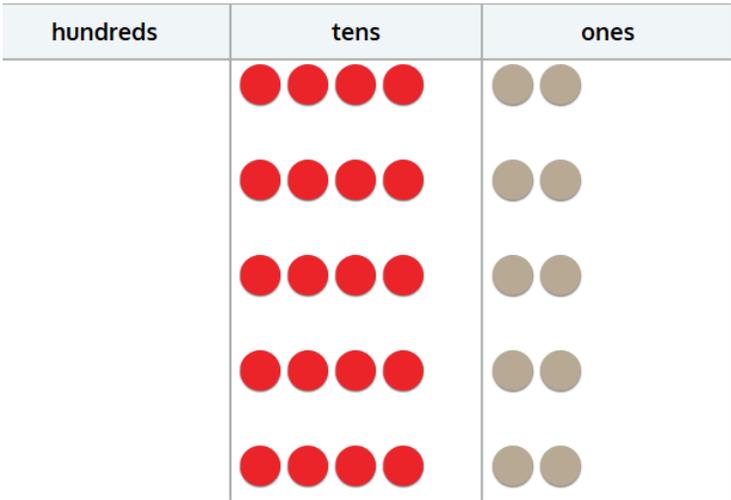
$$\begin{array}{r} 4\ 2 \\ \times \quad 5 \\ \hline 1\ 0 \\ +\ 2\ 0\ 0 \\ \hline 2\ 1\ 0 \end{array}$$

When you bundle and regroup, you add that number to the total product in the next column.

$$\begin{array}{r} \textbf{4}\;5\;7 \\ \times \qquad \textbf{4} \\ \hline 2\;\;2 \\ \hline 1,8\;2\;8 \end{array}$$

Area Model

	200	30	4
8	1,600	240	32

$$\begin{array}{r} 234 \\ \times\quad 8 \\ \hline 1,600 \\ 240 \\ +\quad 32 \\ \hline 1,872 \end{array}$$

8 × (200 + 30 + 4)

(8 × 200) + (8 × 30) + (8 × 4)

A cafeteria makes 4,408 lunches each day. How many lunches are made Monday through Friday?

4,408 lunches

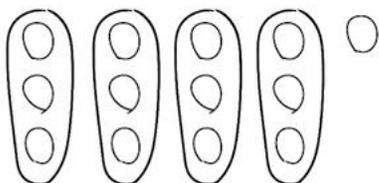|	4 thousands	4 hundreds	8 ones
5	20,000	2,000	40

$$\begin{array}{r} 4,408 \\ \times\qquad 5 \\ \hline 40 \\ 2,000 \\ +\;20,000 \\ \hline 22,040 \end{array}$$

$$\begin{array}{r} 4,408 \\ \times\qquad 5 \\ \hline 22,040 \end{array}$$

Solving with the Area Model   Solving with Algorithm

Dividing with Remainders (what's left over)

There are 13 students in PE class separated into 4 teams.
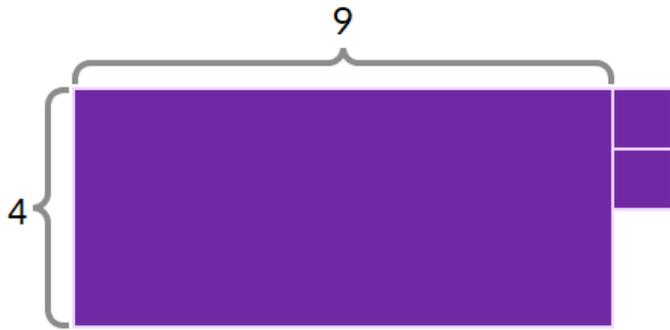How many students are on each team?

4 × 3 = 12

12 + 1 = 13

13 ÷ 4
The quotient is 3.
The remainder is 1.

There are 3 in each group with 1 remaining.

Use the area model to solve 38 ÷ 4.

9

Quotient = 9

Remainder = 2

4

Dividing using Place Value Chart and Algorithm

Division

Dangerous
(Divide)
$$\frac{1}{7\overline{)1064}}$$

Monkeys
(Multiply)
$$\frac{*\ 1}{7\overline{)1064}}$$
$$7$$

Shelly Anton All Rights Reserved

Swipe
(Subtract)
$$7\overline{)1064}$$
$$\frac{-7}{3}$$

Bananas
(Bring Down)
$$7\overline{)1064}$$
$$\frac{-7\downarrow}{36}$$

Repeat

$45 \div 4$
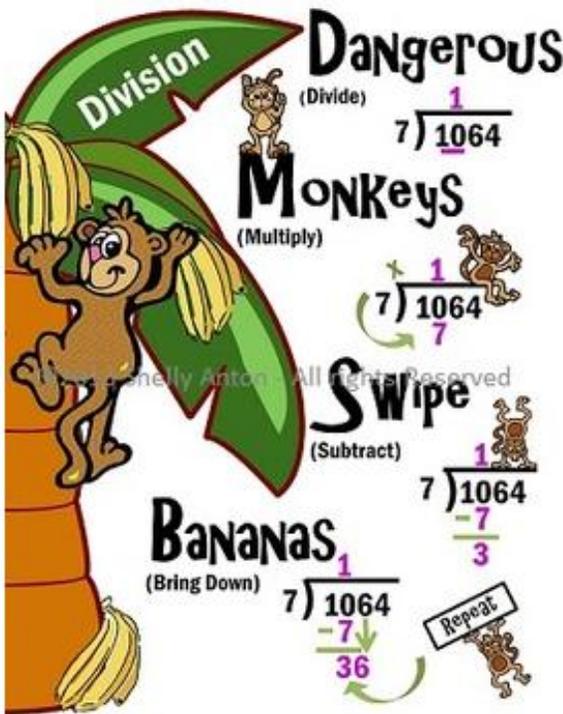
tens	ones
⊖ ⊕	⊖ ⊕

{ 1 ten 1 one

Quotient → 1 1 R 1

$$4\overline{)45}$$
$$\frac{-4\downarrow}{05}$$
$$\frac{-\ 4}{1}$$

Remainder

---

tens	ones
⊘⊘⊘⊘⊘	⊘⊘⊘⊘⊘ ⊘⊘⊘⊘⊘ ⊘⊘⊘⊘⊘
○○	○○○○○ ○○○
○○	○○○○○ ○○○

} 2 tens
  8 ones

$$\frac{28}{2\overline{)56}}$$
$$\frac{-4}{16}$$
$$\frac{-16}{0}$$

When you have a ten leftover, unbundle it and then divide the total ones you have.

What is 72 ÷ 4?

```
         10              8
      ┌───────┐   ┌───────┐
   4  │   40     │    32     │
      └──────────┴───────────┘
```

(72)
  /   \
(40) (32)

$$72 \div 4 = (40 \div 4) + (32 \div 4)$$
$$= \quad 10 \quad + \quad 8$$
$$= \quad 18$$

$1 \times 15 = 15$

$3 \times 5 = 15$ Composite

Factors of 15

1, 3, 5, 15
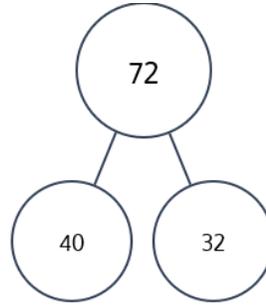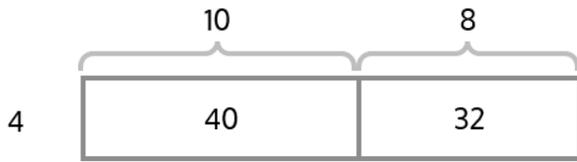
Factors– the numbers used when multiplying to get the **product** (total)	
Composite Numbers– have <u>more than</u> two factors	
Prime Numbers– have exactly <u>two</u> factors, 1 and the number itself	

$1 \times 13 = 13$
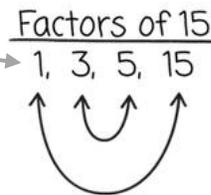
Prime   1, 13

When you divide a product (whole) by a number, if you **DO NOT** have a remainder, then it is a factor.

When you divide a product (whole) by a number, if you **DO** have a remainder, then it is **NOT** a factor.

Multiples– products of the factors (skip count to find multiples)

Multiples of 4

0, 4, 8, 12, 16, 20, 24, 28, 32

0 is a multiple of every number!!!!

FACTORS	MULTIPLES
Two factors are multiplied together to get a product.	The product of a given number and another factor multiplied together.
32 ⬅ Product Factors 1 │ 32 ⮕ 2 │ 16 ⬅ 4 │ 8	4 x 9 = 36 ⬆ Multiple
Two ways to think about this...	Find the multiples of 4... 4 x 1 = 4 4 x 2 = 8 4 x 3 = 12 4 x 4 = 16 4 x 5 = 20 4 x 6 = 24 4 x 7 = 28 4 x 8 = 32 4 x 9 = 36
*What can I multiply together (factors) to get my number (product)? 1 x 32 = 32 2 x 16 = 32 4 x 8 = 32	
So the numbers 1, 2, 4, 8, 16 & 32 are factors of 32.	4, 8, 12, 16, 20, 24, 28, 32, 36 and so on are multiples of 4.
*What numbers can I divide evenly into my number?	Skip counting by 4 also will give you the multiples!

| 1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

All the yellow numbers are prime (only 1 set of factors).

All the purple numbers are composite (multiple sets of factors).

1 is neither composite or prime.

$$
\begin{array}{r}
5\ 1 \\
3\,\overline{)1\ 5\ 5} \\
-1\ 5\ \downarrow \\
\hline
0\ 5 \\
-\ \ \ 3 \\
\hline
2
\end{array}
$$

When you don't have enough hundreds to divide, then move over to the tens and divide.
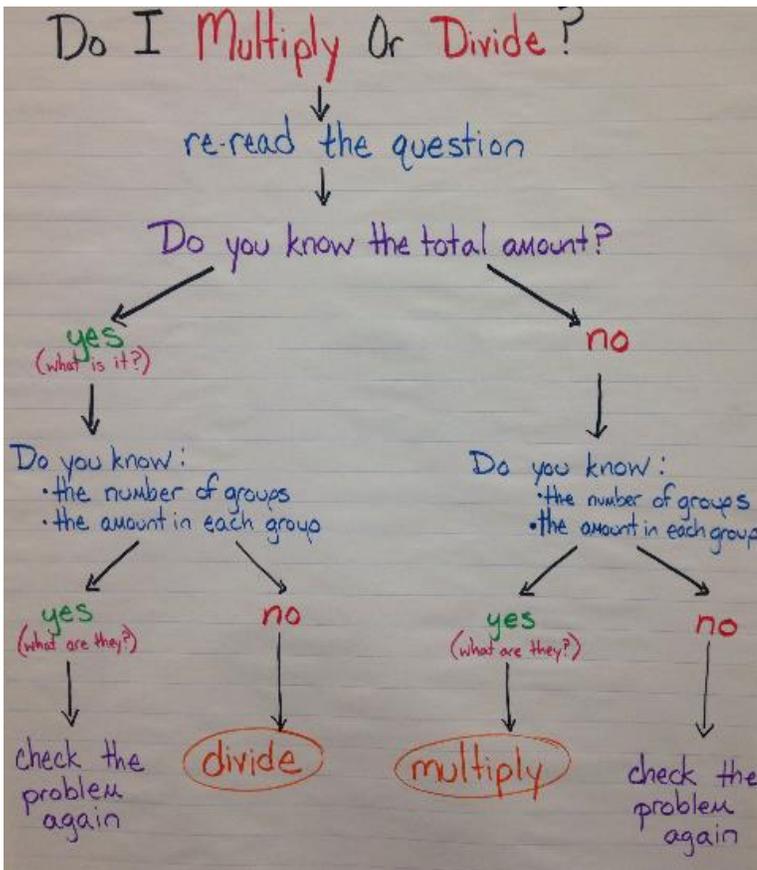
Associative Property

You can group the factors in different ways, and the product will be the same.

$(3 \times 4) \times 2 = 24$

12 × 2 = 24

$3 \times (4 \times 2) = 24$

3 × 8 = 24

Do I Multiply Or Divide?

re-read the question

Do you know the total amount?

yes (what is it?) — no

Do you know:
• the number of groups
• the amount in each group

yes (what are they?) — no

Do you know:
• the number of groups
• the amount in each group

yes (what are they?) — no

check the problem again   divide   multiply   check the problem again

Distributive Property

A multiplication fact can be broken up into the sum of two other multiplication facts.

$23 \times 2 = ?$

$(20 + 3) \times 2 =$

Break it into numbers that are easier to multiply with mental math

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

$40 + 6 = 46$

2 tens | 5 ones

3 tens | 6 hundreds | 15 tens
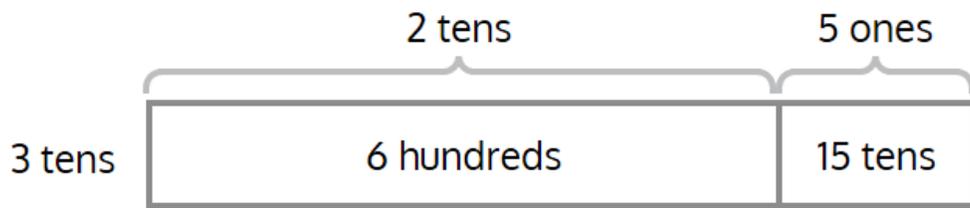
$$\begin{array}{r} 2\ 5 \\ \times\quad 3\ 0 \\ \hline 1\ 5\ 0 \\ +\ 6\ 0\ 0 \\ \hline 7\ 5\ 0 \end{array}$$

Multiplying with the Area Model

	10	2
4	40	8
10	100	20

48

120
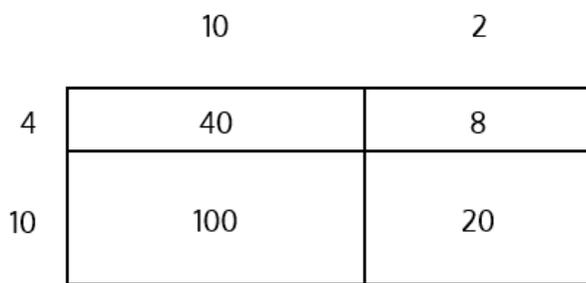
$$\begin{array}{r} 1\ 2 \\ \times\ 1\ 4 \\ \hline 4\ 8 \\ +\ 1\ 2\ 0 \\ \hline 1\ 6\ 8 \end{array}$$