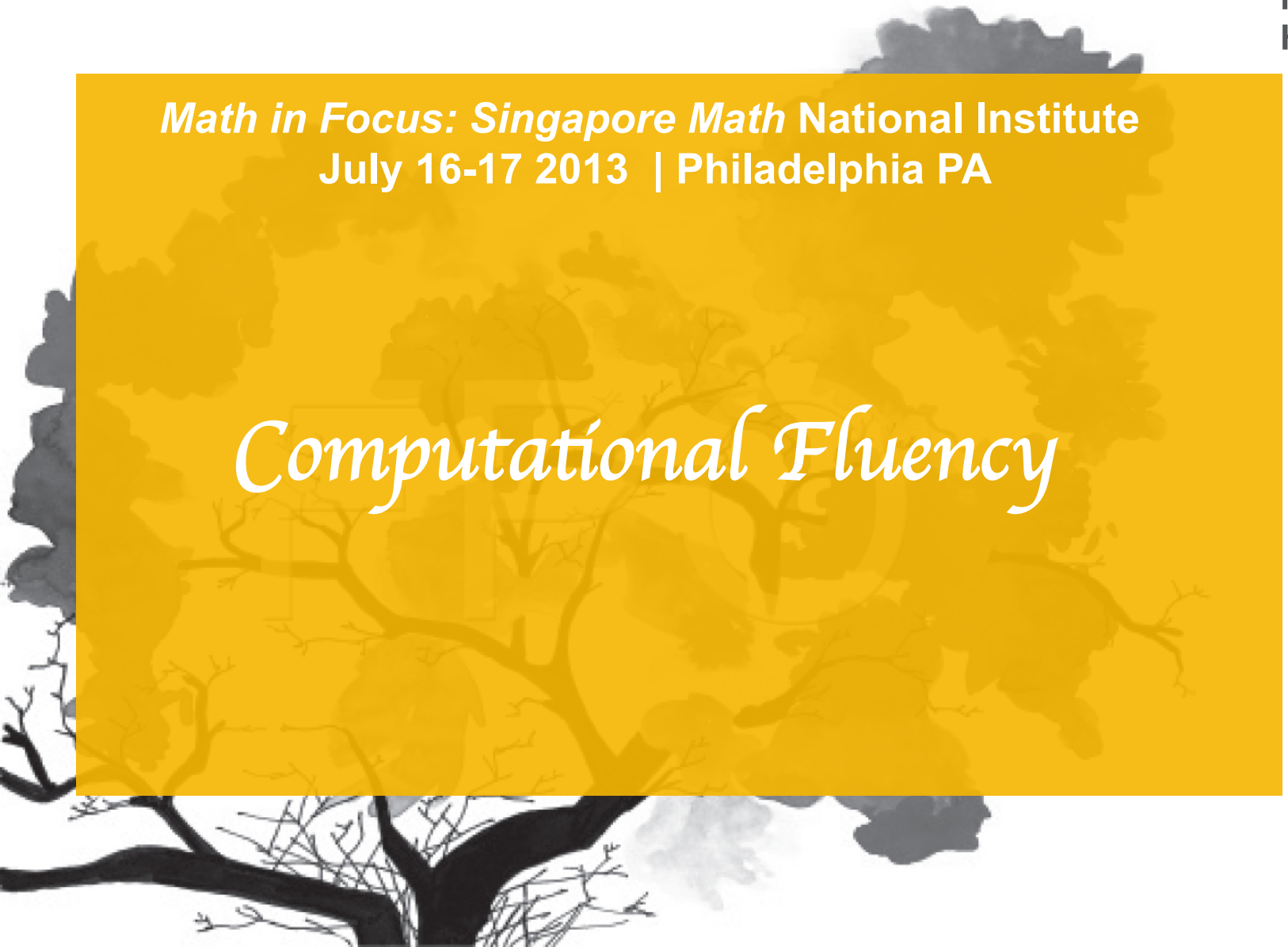
Math in Focus: Singapore Math National Institute
July 16-17 2013 | Philadelphia PA

Computational Fluency



Houghton Mifflin Harcourt

Just the Facts…

- Is it a necessity?
- What do we expect?
- What are the roadblocks?

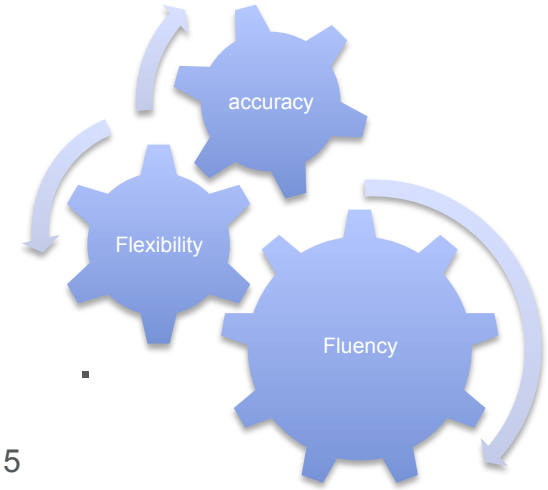
Try These…

22 X 12 =

What do the writers of *Math in Focus-Singapore Math* believe?

What evidence do you have?

Remembering and memorizing are not the same…

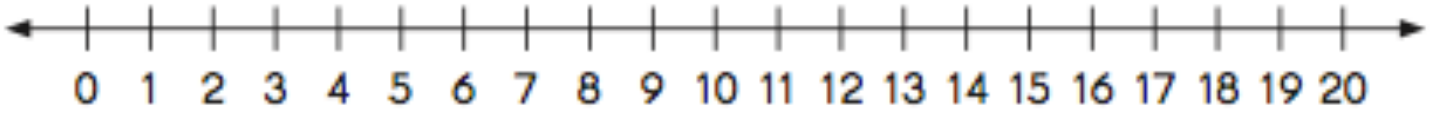


- Conceptual understanding & the ability to visualize.
- Strategies that strengthen understanding and promote efficiency.
- Fluency from understanding

At the aquarium, Hector sees 3 octopuses.
Each octopus has 8 tentacles.
How many tentacles do the octopuses have in all?

$2 \times 4 \times 2 =$ _____ $\times$ _____

$=$ _____



Fill in the missing numbers.

3. 8 sixes = 8 × _____

4. 5 × 6 = _____ sixes

5. 7 + 7 + 7 + 7 + 7 + 7 = 6 × _____

6. 6 + 6 + 6 + 6 + 6 + 6 + 6 = 7 × _____

7. 10 × 6 = 6 × _____

8. 3 sixes = 6 + 6 + _____

$5 \times 6 =$ _____

$7 \times 6 =$ _____ groups of 6

$=$ 5 groups of 6 $+$ _____ groups of 6

$=$ _____ $+$ _____

$=$ _____

Be Systematic:

Grade	Standard	Required Fluency
Kindergarten	K.OA.5	Add within 5
		Subtract within 5
First Grade	1.OA.6	Add within 10
		Subtract within 10
Second Grade	2.OA.2	Add within 20
		Subtract within 20
	2.NBT.5	Add within 100
		Subtract within 100
Third Grade	3.OA.7	Multiply within 100
		Divide within 100
	3.NBT.2	Add within 1,000
		Subtract within 1,000
Fourth Grade	4.NBT.4	Add within 1,000,000
		Subtract within 1,000,000
Fifth Grade	5.NBT.5	Multi-digit multiplication

Houghton Mifflin Harcourt

4 Addition Strategies

When zero is added to a number, the result is the number itself.

Know the doubles, use them to figure out the near doubles.

Put the greater number in your head, then count on the lesser number.

Determine how many more to make ten, add the additional.

Houghton Mifflin Harcourt

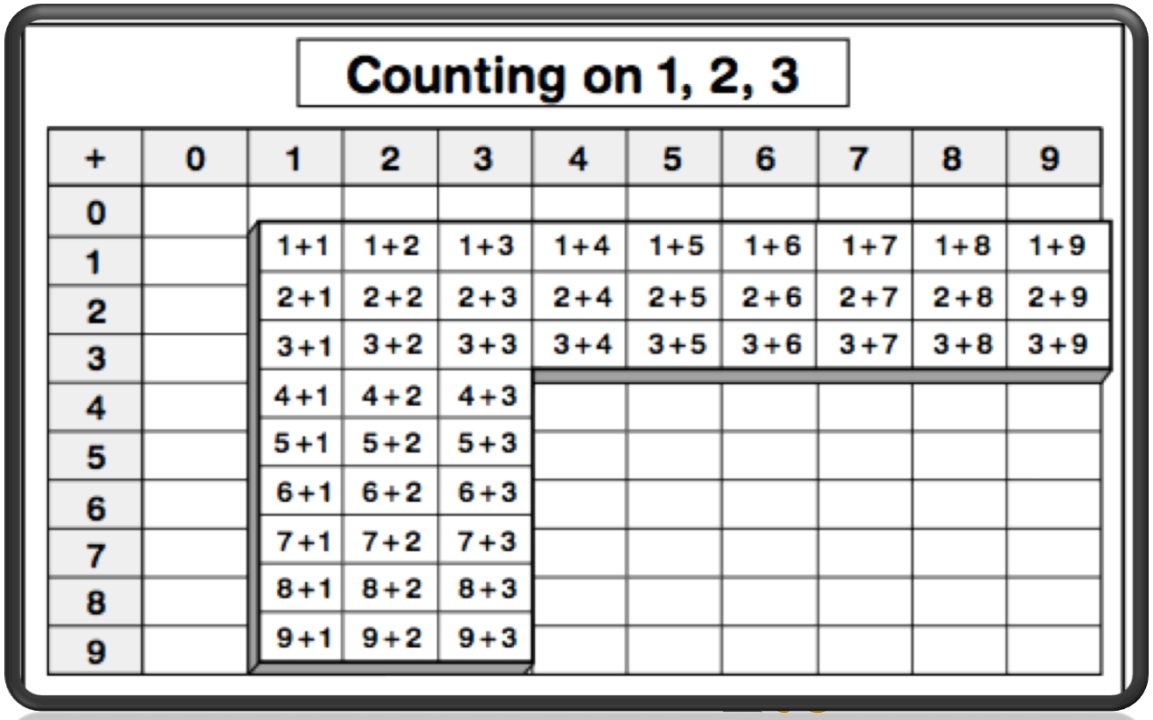
Zero in Addition

+	0	1	2	3	4	5	6	7	8	9
0	0+0	0+1	0+2	0+3	0+4	0+5	0+6	0+7	0+8	0+9
1	1+0									
2	2+0									
3	3+0									
4	4+0									
5	5+0									
6	6+0									
7	7+0									
8	8+0									
9	9+0									

When zero is added to a number, the result is the number itself.

Houghton Mifflin Harcourt

Put the greater number in your head, then count on the lesser number.
8 + 2….8,9,10
3 + 9….9,10,11,12



Houghton Mifflin Harcourt

Doubles, Near Doubles

+	0	1	2	3	4	5	6	7	8	9
0										
1										
2										
3										
4					4+4	4+5	4+6			
5					5+4	5+5	5+6	5+7		
6					6+4	6+5	6+6	6+7	6+8	
7						7+5	7+6	7+7	7+8	7+9
8							8+6	8+7	8+8	8+9
9								9+7	9+8	9+9

Memorize the doubles, use them to figure out the near doubles.

7 + 7 = 14

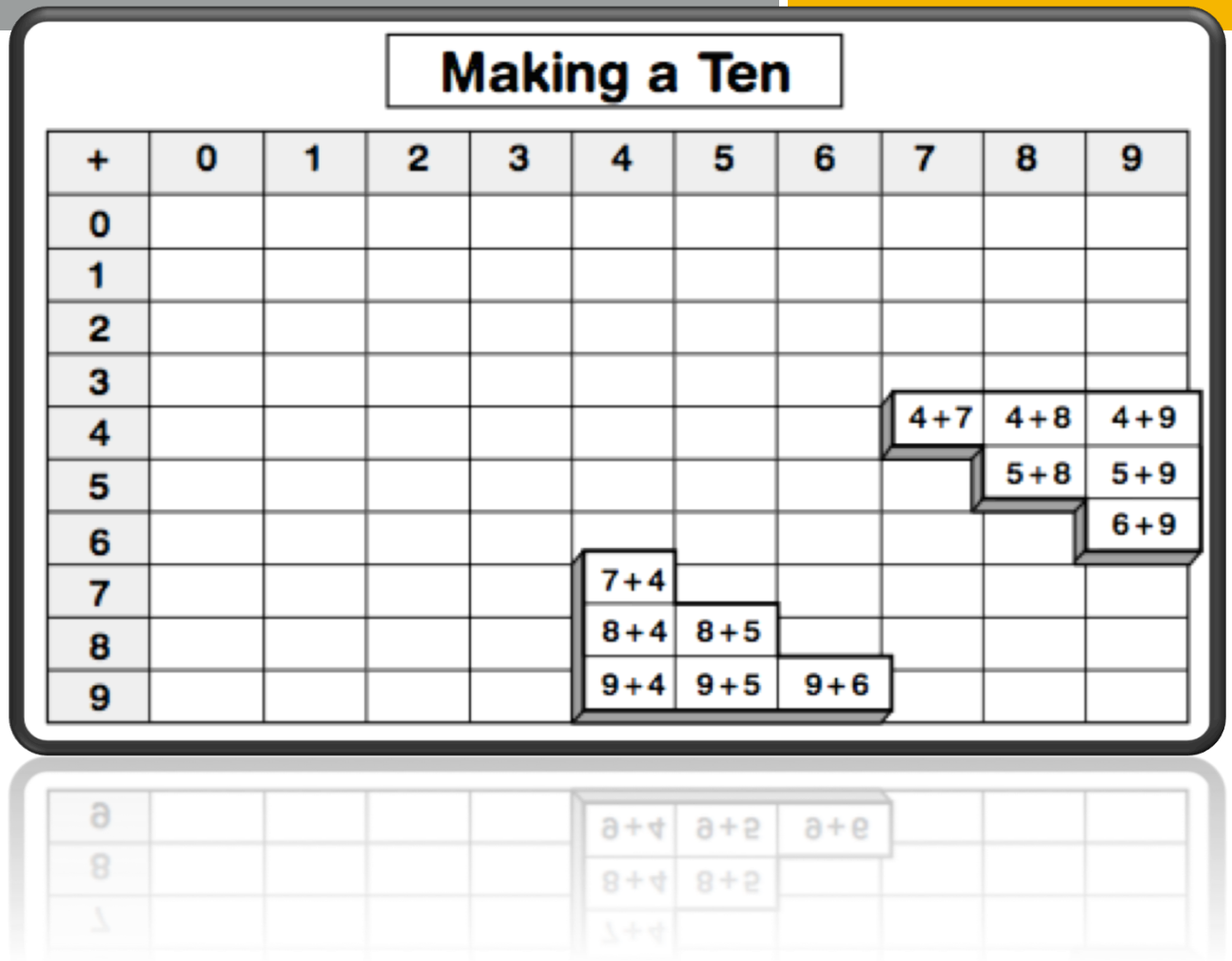
7 + 6 = one less than 14

Houghton Mifflin Harcourt

Determine how many more to make ten, add the additional.

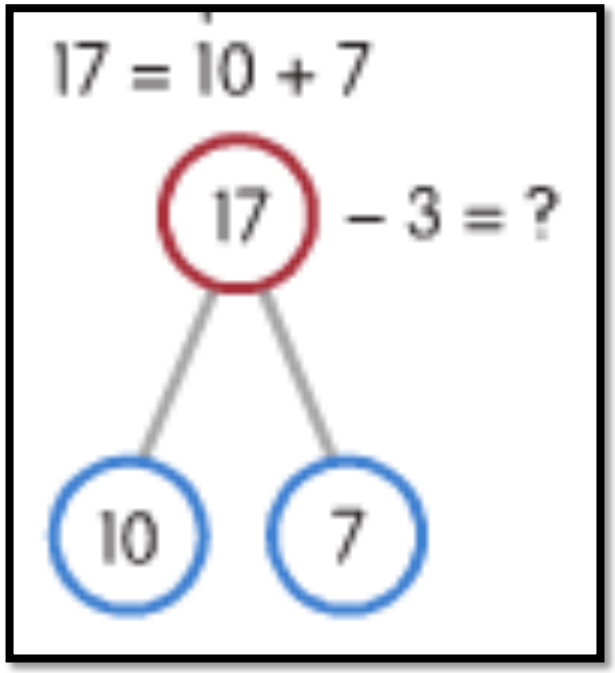
4 + 8= 8 + 2 + 2

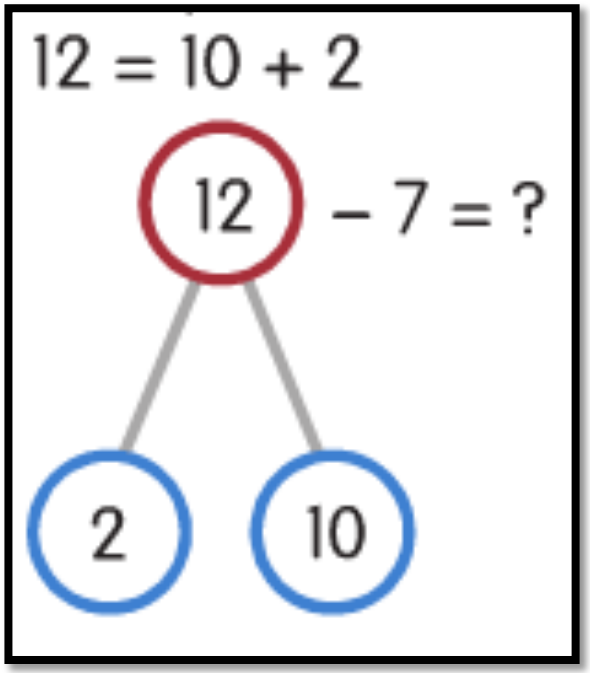
2 more to ten and 2 more makes 12



Houghton Mifflin Harcourt

Putting the Strategies into Practice





Houghton Mifflin Harcourt

4 Subtraction Strategies

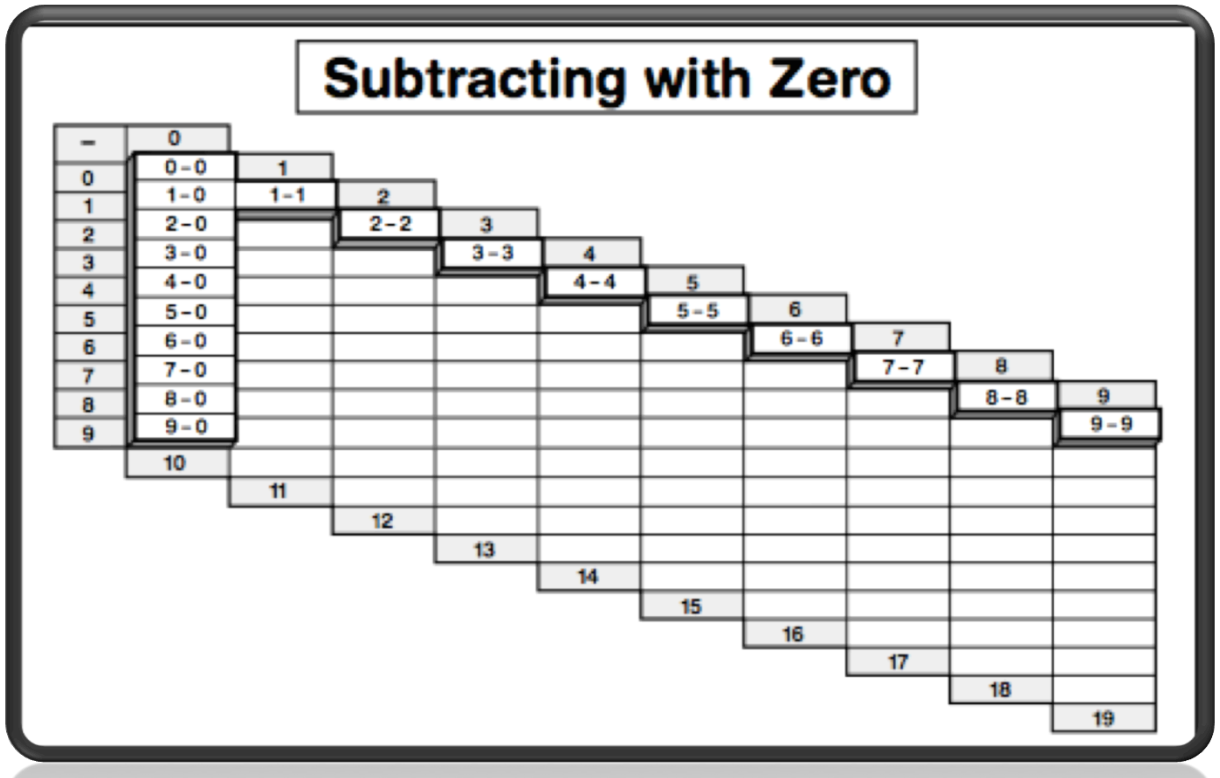
When you subtract zero from any number, the result is the number itself.

Use doubles, near doubles and making tens.

Start with the lesser number, count up to the greater.

Put the greater number in your head, count back the number of places indicated by the lesser number.

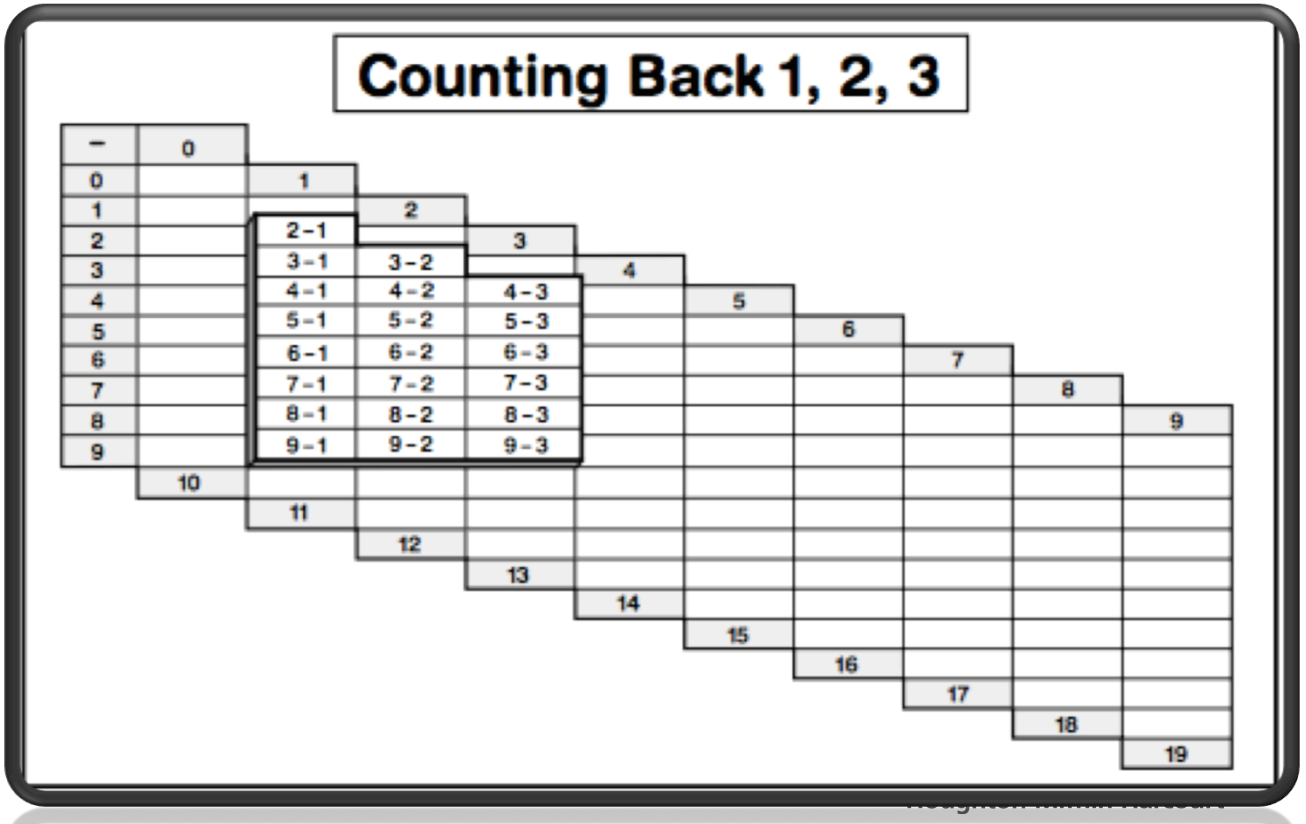
Houghton Mifflin Harcourt

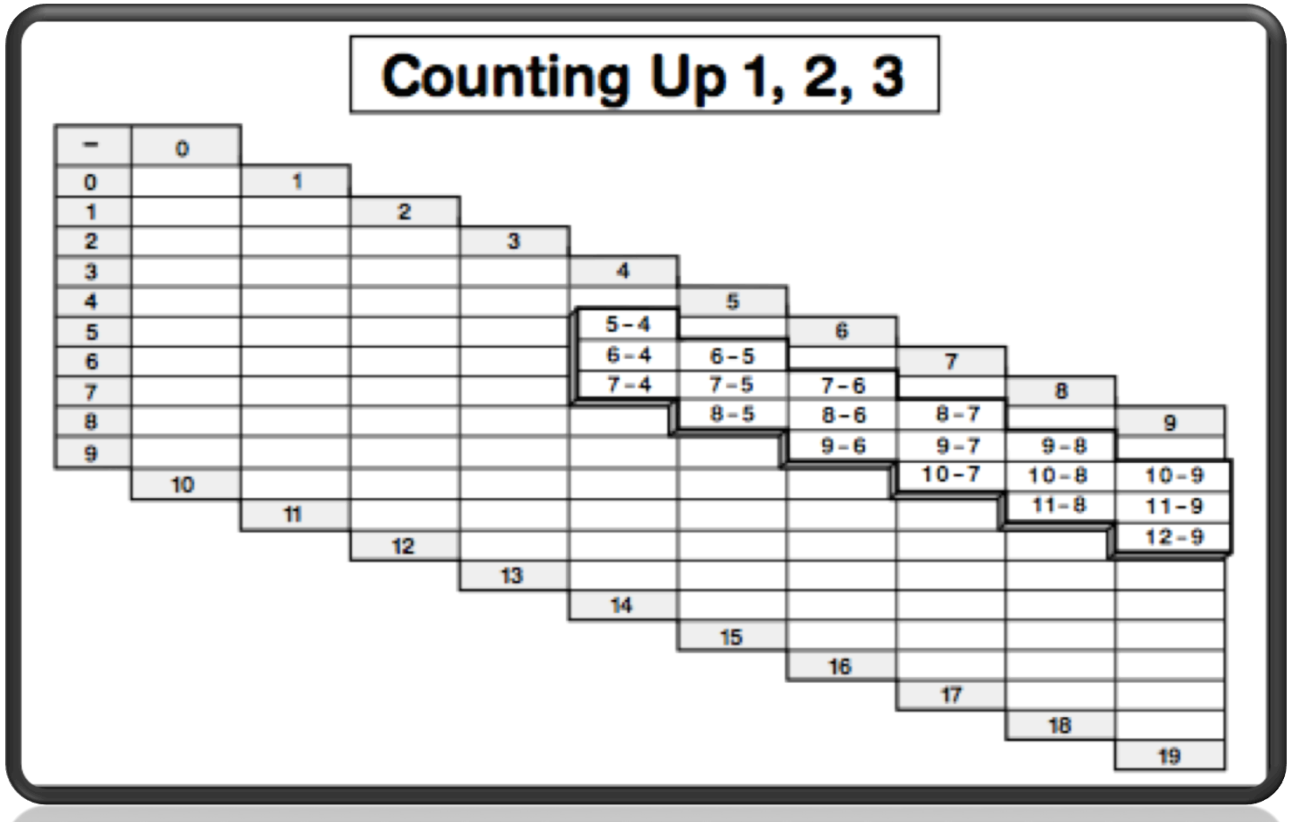


When you subtract zero from any number, the result is the number itself.

Houghton Mifflin Harcourt

Put the greater number in your head, count back the number of places indicated by the lesser number.

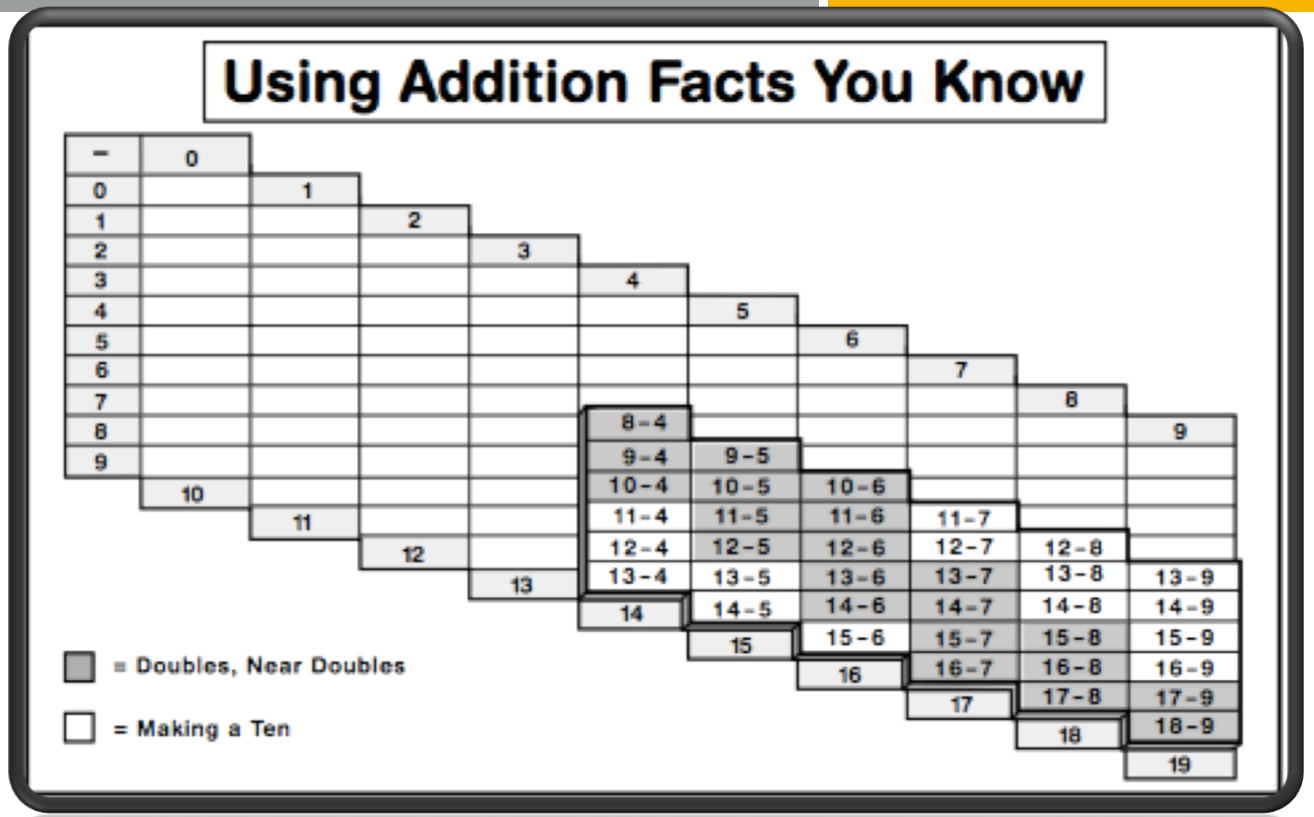




Start with the lesser number, count up to the greater. Keep track of how many places you count up.

Houghton Mifflin Harcourt

Use doubles, near doubles and making tens.



Houghton Mifflin Harcourt

4 Multiplication Strategies

Relate the doubles to learning the 2's, and use doubling the doubles to find the 4's.

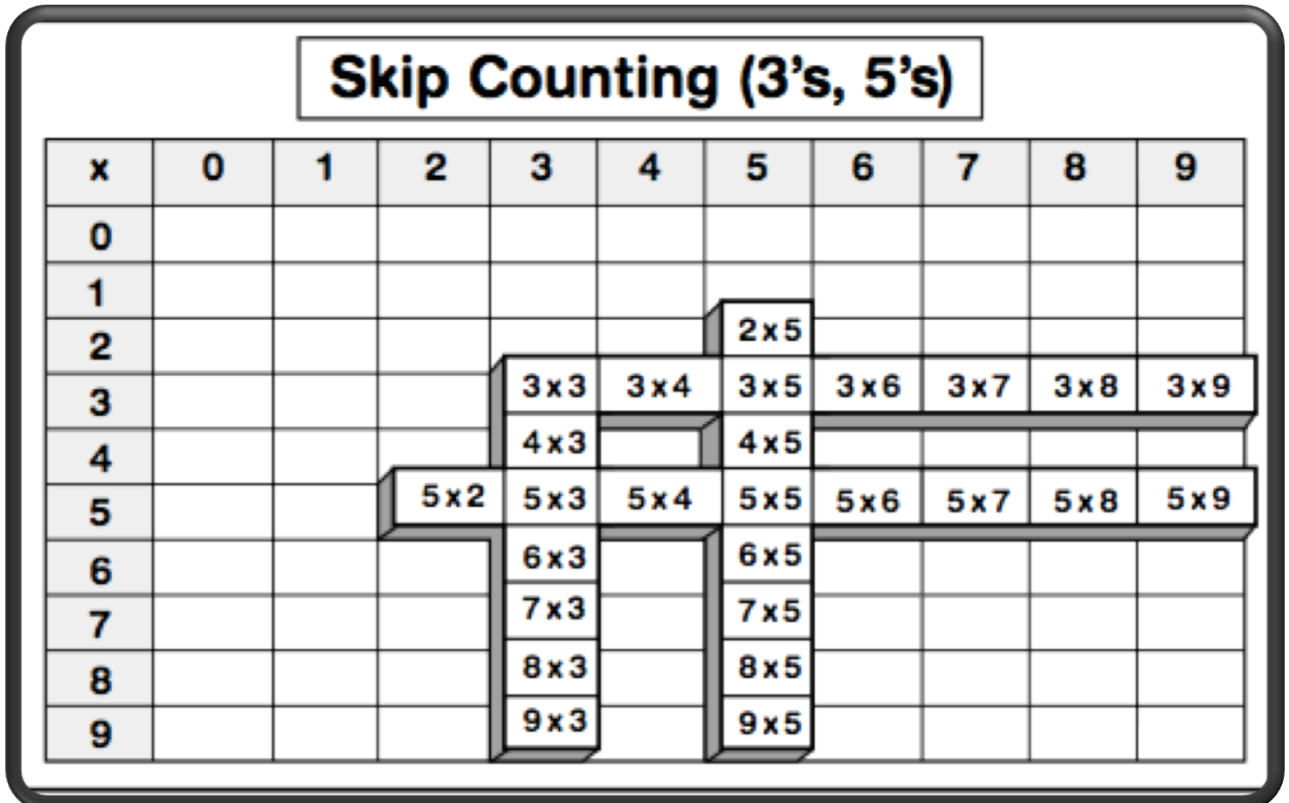
- Use the associative property.

- Begin by knowing the 2's 5's and 10's. Add a row or subtract a row.

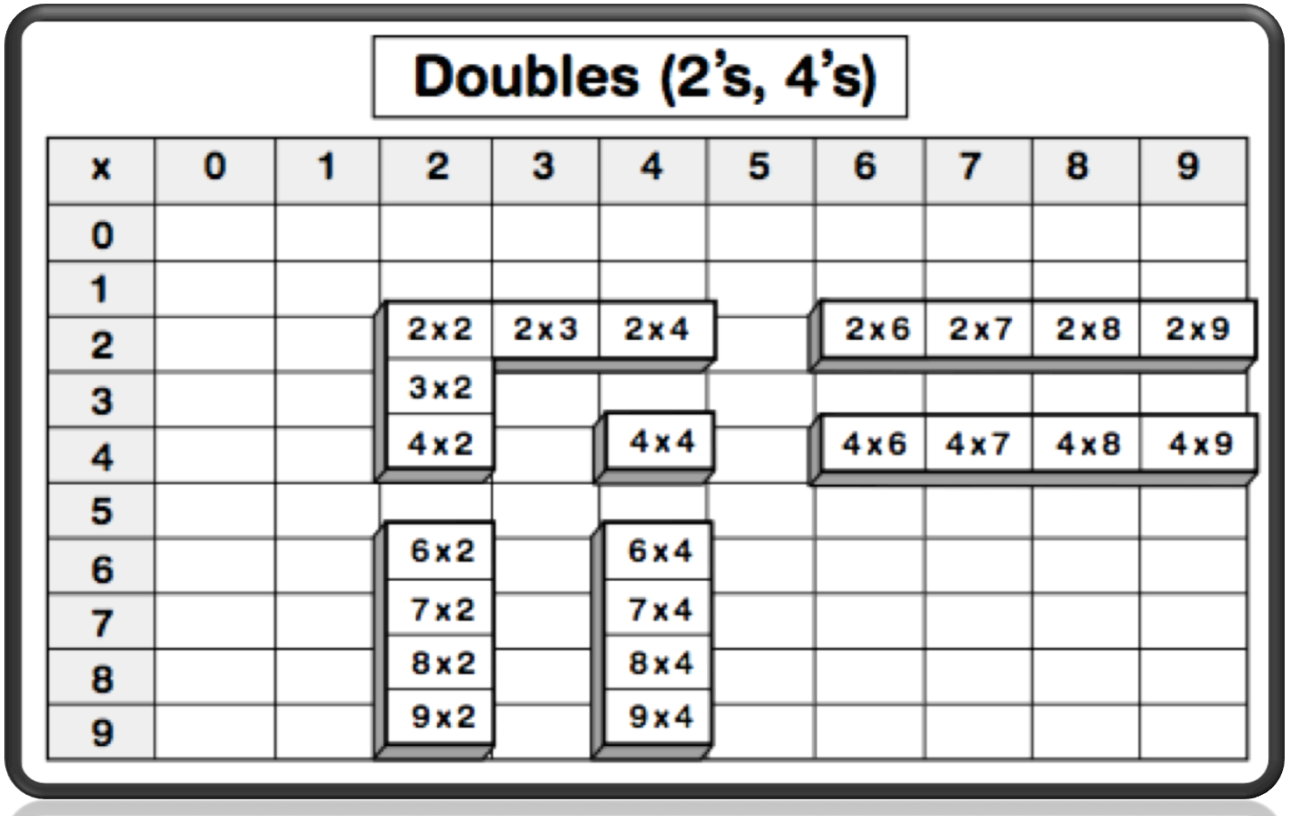
-Use what you know…Use the 2's and 5's to find the 7's. Use the 2's and 10's to find the 8's.

Houghton Mifflin Harcourt

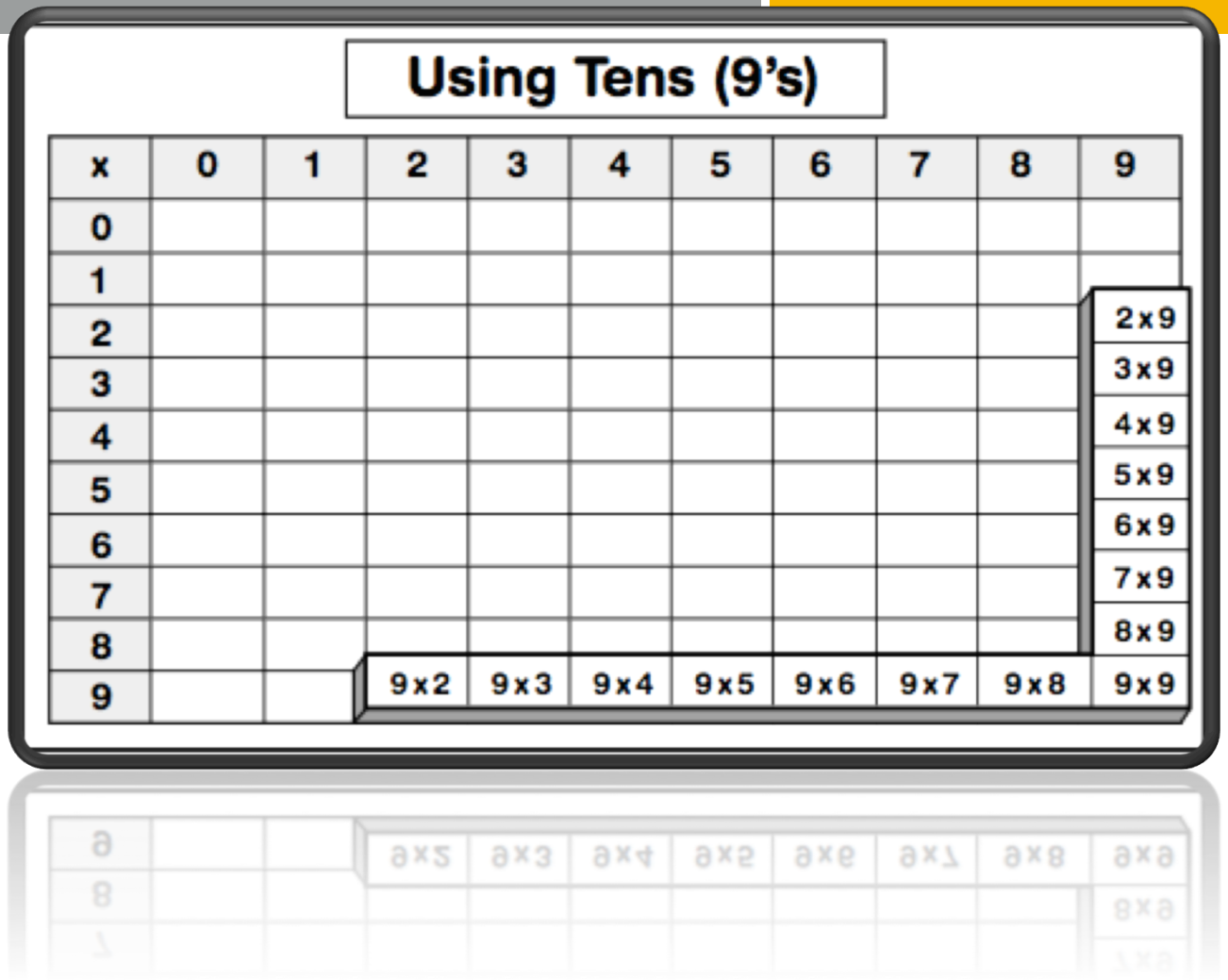
Skip count by 3's or 5's to find these facts.



Relate the doubles to learning the 2's, and use doubling the doubles to find the 4's.



Multiply by ten then subtract one group
9 x 7 =(10 x 7) - 7.



Houghton Mifflin Harcourt

Use What You Know (6's, 7's, 8's)

x	0	1	2	3	4	5	6	7	8	9
0										
1										
2										
3										
4										
5										
6							6x6	6x7	6x8	6x9
7							7x6	7x7	7x8	7x9
8							8x6	8x7	8x8	8x9
9							9x6	9x7	9x8	9x9

Use the 2's and 5's to find the 7's. Use the 2's and 10's to find the 8's.

Houghton Mifflin Harcourt

Know what they know…

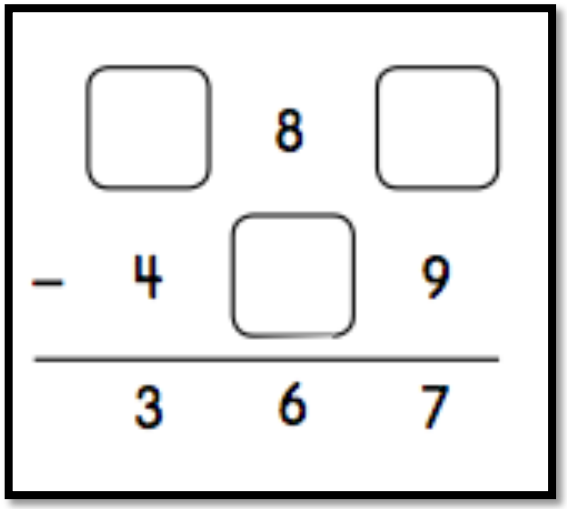
Find all possible values of P, Q, R, and S.
Regrouping is not used in the problem.
P, Q, R, and S represent different numbers.

$$\begin{array}{rr} & P\ 3\ Q \\ \times & \qquad 3 \\ \hline & R\ 9\ S \end{array}$$

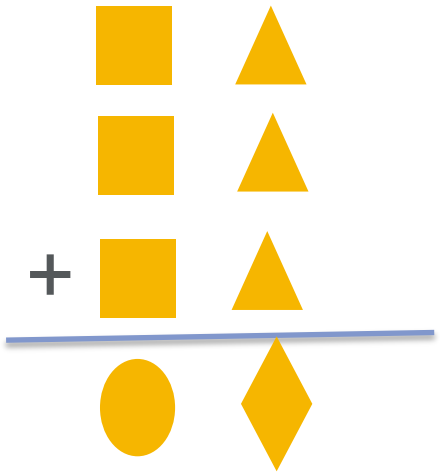
Invest in thinking…

456 = _____ + 19

What is the missing number?



Invest in thinking…



Math in Focus: Singapore Math National Institute
July 16-17 2013 | Philadelphia PA

Thank You