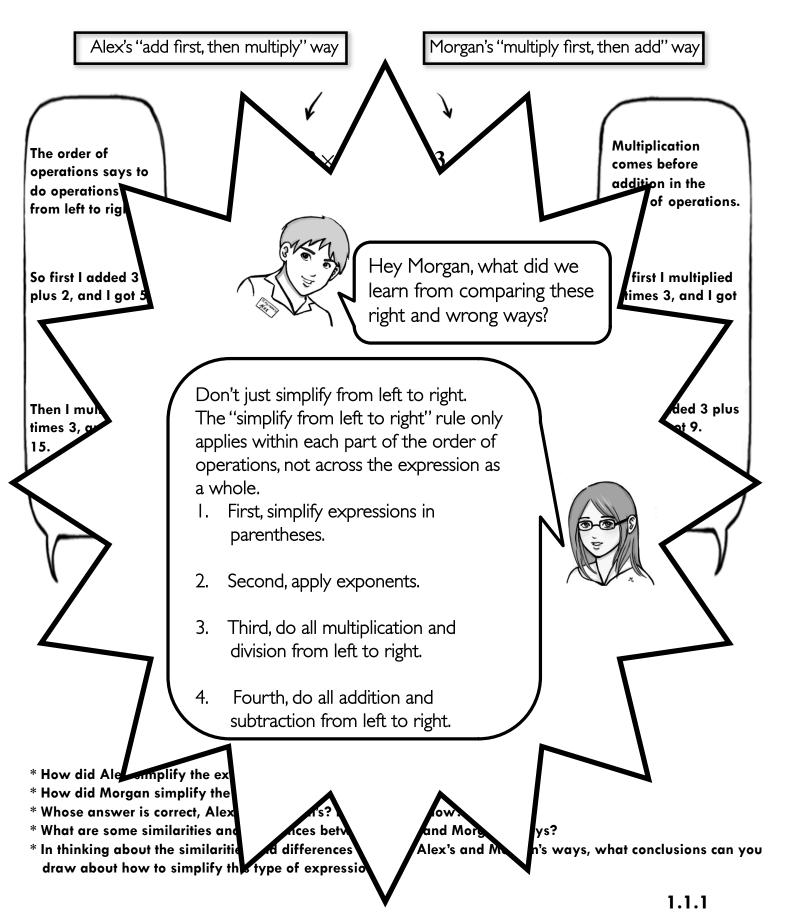
### Alex and Morgan were asked to simplify $3+2\times 3$

Morgan's "multiply first, then add" way Alex's "add first, then multiply" way **Multiplication** The order of  $3+2\times3$  $3+2\times3$ comes before operations says to addition in the do operations order of operations. from left to right. So first I added 3 So first I multiplied 3 + 6 $5\times3$ 2 times 3, and I got plus 2, and I got 5. Then I added 3 plus Then I multiplied 5 15 times 3, and I got 6, and I got 9. 15.

- \* How did Alex simplify the expression?
- \* How did Morgan simplify the expression?
- \* Whose answer is correct, Alex's or Morgan's? How do you know?
- \* What are some similarities and differences between Alex's and Morgan's ways?
- \* In thinking about the similarities and differences between Alex's and Morgan's ways, what conclusions can you draw about how to simplify this type of expression?

#### Alex and Morgan were asked to simplify $3+2\times 3$



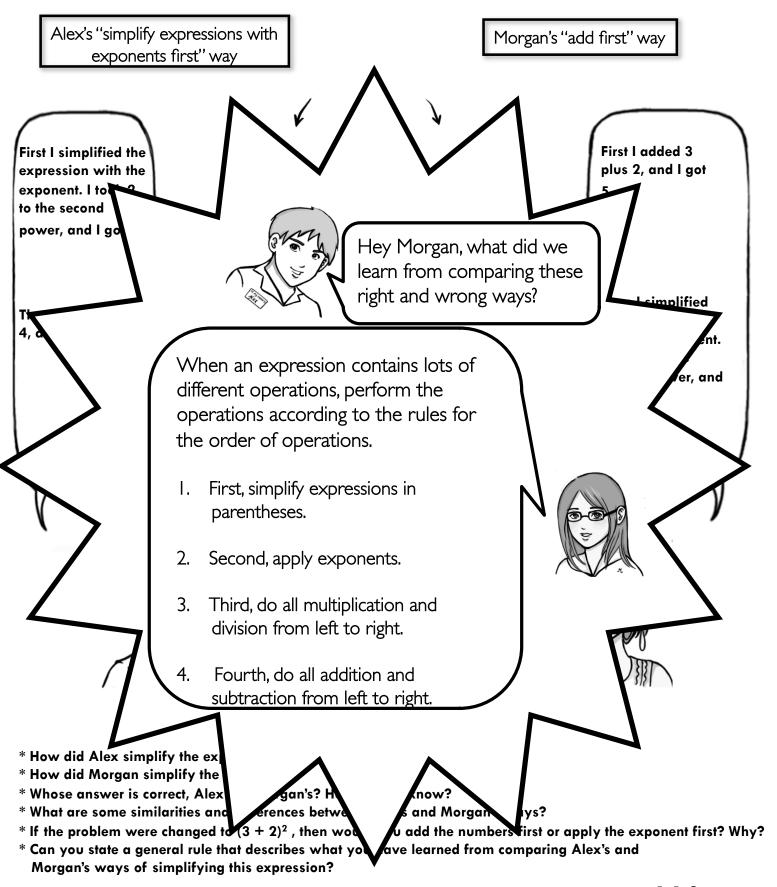
1a	How did Alex simplify the expression?  1b How did Morgan simplify the expression?
ļ	
2	Whose answer is correct, Alex's or Morgan's? How do you know?
L	whose answer is correct, rich s or morgan s. from do you know.
3	What are some similarities and differences between Alex's and Morgan's ways?
•	what are some similarides and differences between thex's and 14018an's ways.
ļ	
4	In thinking about the similarities and differences between Alex's and Morgan's ways, what conclusions
	can you draw about how to simplify this type of expression?

# Alex and Morgan were asked to simplify $3+2^2$

Alex's "simplify expressions with Morgan's "add first" way exponents first" way First I added 3 First I simplified the plus 2, and I got expression with the  $3 + 2^2$  $3+2^{2}$ exponent. I took 2 to the second power, and I got 4. Then I simplified 3 + 4Then I added 3 plus the expression 4, and I got 7. with the exponent. I took 5 to the second power, and I got 25. 25

- \* How did Alex simplify the expression?
- \* How did Morgan simplify the expression?
- \* Whose answer is correct, Alex's or Morgan's? How do you know?
- \* What are some similarities and differences between Alex's and Morgan's ways?
- \* If the problem were changed to  $(3 + 2)^2$ , then would you add the numbers first or apply the exponent first? Why?
- \* Can you state a general rule that describes what you have learned from comparing Alex's and Morgan's ways of simplifying this expression?

## Alex and Morgan were asked to simplify $3+2^2$



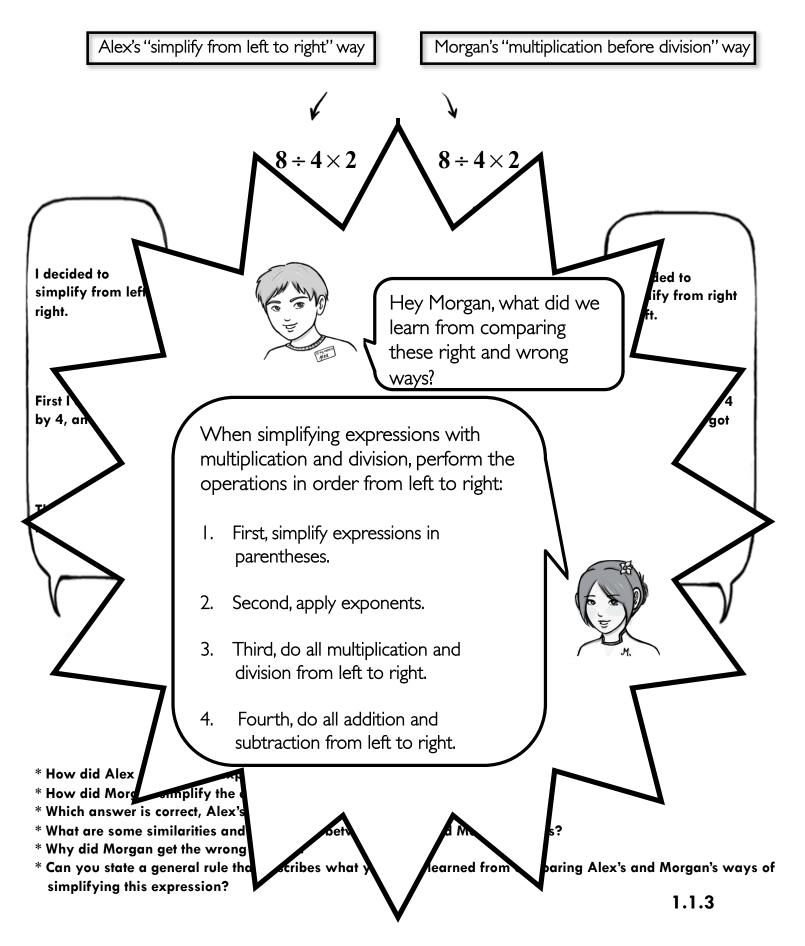
1a	How did Alex simplify the expression?  1b How	w did Morgan simplify the expression?
2	2 Whose answer is correct, Alex's or Morgan's? How do you	know?
3	3 What are some similarities and differences between Alex's a	nd Morgan's ways?
	What are some ommarides and differences between their sta	ina morgani o wayo.
4	If the problem were changed to $(3+2)^2$ , then would you first? Why?	add the numbers first or apply the exponent
	mst. why.	
<u>[</u>		
5	Can you state a general rule that describes what you have lead ways of simplifying this expression?	arned from comparing Alex's and Morgan's
	ways of simplifying this expression:	

### Alex and Morgan were asked to simplify $8 \div 4 \times 2$

Morgan's "multiplication before division" way Alex's "simplify from left to right" way  $8 \div 4 \times 2$  $8 \div 4 \times 2$  $8 \div (4 \times 2)$  $(8 \div 4) \times 2$ I decided to I decided to do simplify from left to multiplication first. right. First I did 8 divided First I multiplied 4  $2 \times 2$  $8 \div 8$ by 4, and I got 2. times 2, and I got Then I multiplied 2 Then I did 8 times 2, and I got 4. divided by 8, and I got 1.

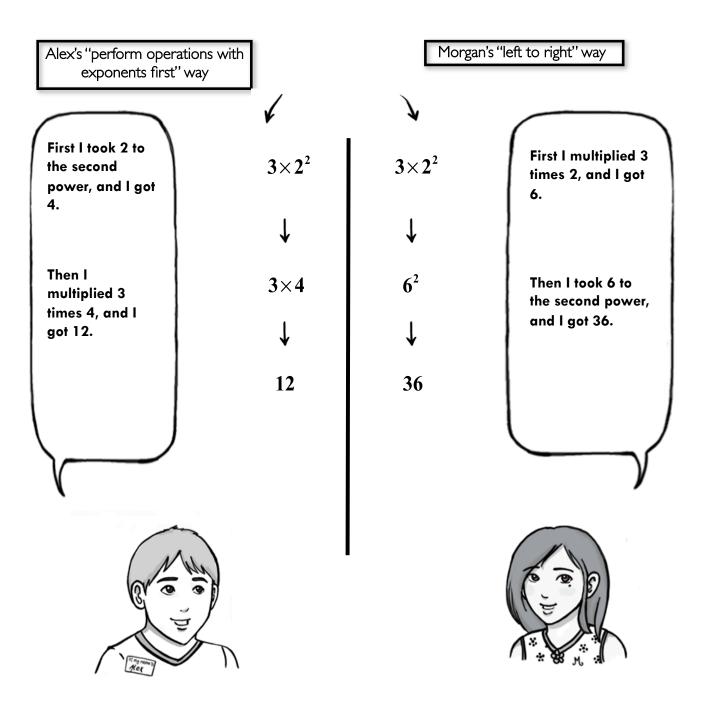
- \* How did Alex simplify the expression?
- \* How did Morgan simplify the expression?
- \* Which answer is correct, Alex's or Morgan's? How do you know?
- \* What are some similarities and differences between Alex's and Morgan's ways?
- \* Why did Morgan get the wrong answer?
- \* Can you state a general rule that describes what you have learned from comparing Alex's and Morgan's ways of simplifying this expression?

#### Alex and Morgan were asked to simplify $8 \div 4 \times 2$



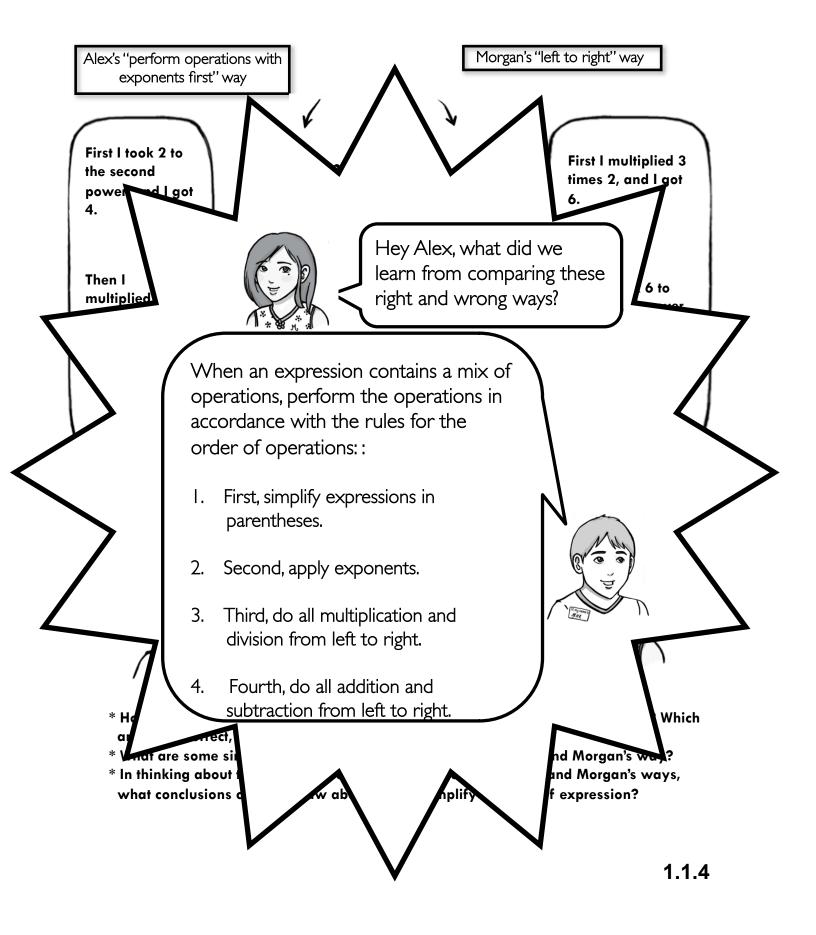
1a	How did Alex simplify the expression?  1b How did Morgan simplify the expression?
2	Which answer is correct, Alex's or Morgan's? How do you know?
3	What are some similarities and differences between Alex's and Morgan's ways?
	W/I 1'13 f
4	Why did Morgan get the wrong answer?
ļ	
5	Can you state a general rule that describes what you have learned from comparing Alex's and Morgan's ways of simplifying this expression?
	ways of shirphrying this expression.

## Alex and Morgan were asked to simplify $3 \times 2^2$



- \* How did Alex simplify the expression? How did Morgan simplify the expression? Which answer is correct, Alex's or Morgan's? How do you know?
- \* What are some similarities and differences between Alex's way and Morgan's way?
- \* In thinking about the similarities and differences between Alex's and Morgan's ways, what conclusions can you draw about how to simplify this type of expression?

### Alex and Morgan were asked to simplify $3 \times 2^2$



1a	How did Alex simplify the expression?    1b   How did Morgan simplify the expression?
2	Which answer is correct, Alex's or Morgan's? How do you know?
2	when answer is correct, rick's or Morgan's. From do you know.
3	What are some similarities and differences between Alex's way and Morgan's way?
4	In thinking about the similarities and differences between Alex's and Morgan's ways, what conclusions can you draw about how to simplify this type of expression?