Which is correct?

Alex and Morgan were asked to simplify $3+2\times3$

Alex's "add first, then multiply" way

The order of operations says to do operations from left to right.

$3+2\times3$

↓

So first I added 3 plus 2, and I got 5.

5×3

↓

Then I multiplied 5 times 3, and I got 15.

15

Morgan's "multiply first, then add" way

$3+2\times3$

↓

Multiplication comes before addition in the order of operations.

$3+6$

↓

So first I multiplied 2 times 3, and I got 6.

9

Then I added 3 plus 6, and I got 9.

*** 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?**

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So first I added 3 plus 2, and I got 5

first I multiplied times 3, and I got

Then I mul times 3, a 15.

ded 3 plus t 9.

Hey Morgan, what did we learn from comparing these right and wrong ways?

Don't just simplify from left to right.
The "simplify from left to right" rule only applies within each part of the order of operations, not across the expression as a whole.

1. First, simplify expressions in parentheses.
2. Second, apply exponents.
3. Third, do all multiplication and division from left to right.
4. Fourth, do all addition and subtraction from left to right.

*** How did Ale simplify the ex**
*** How did Morgan simplify the**
*** Whose answer is correct, Alex n's? ow?**
*** What are some similarities and ices betw and Morg ys?**
*** In thinking about the similaritie d differences Alex's and M n's ways, what conclusions can you draw about how to simplify thi type of expressio**

1a How did Alex simplify the expression?

1b How did Morgan simplify the expression?

2 Whose 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?

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?

Which is correct?

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

Alex's "simplify expressions with exponents first" way

First I simplified the expression with the exponent. I took 2 to the second power, and I got 4.

Then I added 3 plus 4, and I got 7.

$3+2^2$

↓

$3+4$

↓

7

Morgan's "add first" way

$3+2^2$

↓

5^2

↓

25

First I added 3 plus 2, and I got 5.

Then I simplified the expression with the exponent. I took 5 to the second power, and I got 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?**

Which is correct?

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

Alex's "simplify expressions with exponents first" way

Morgan's "add first" way

First I simplified the expression with the exponent. I to[ok] 2 to the second power, and I go[t]

Th[en] I added 3 and 4, a[nd got]

First I added 3 plus 2, and I got 5.

I simplified [the] ent.

[2] er, and

Hey Morgan, what did we learn from comparing these right and wrong ways?

When an expression contains lots of different operations, perform the operations according to the rules for the order of operations.

1. First, simplify expressions in parentheses.
2. Second, apply exponents.
3. Third, do all multiplication and division from left to right.
4. Fourth, do all addition and subtraction from left to right.

*** How did Alex simplify the ex[pression]?**
*** How did Morgan simplify the [expression]?**
*** Whose answer is correct, Alex['s] or Morg[an's]? H[ow do you] know?**
*** What are some similarities and [d]ifferences betwe[en] Alex's and Morgan['s] ways?**
*** If the problem were changed to $(3 + 2)^2$, then wo[uld] you add the numbers first or apply the exponent first? Why?**
*** Can you state a general rule that describes what yo[u] have learned from comparing Alex's and Morgan's ways of simplifying this expression?**

1a How did Alex simplify the expression?

1b How did Morgan simplify the expression?

2 Whose 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?

4 If the problem were changed to $(3+2)^2$, then would you add the numbers first or apply the exponent first? Why?

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?

Which is correct?

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

Alex's "simplify from left to right" way	Morgan's "multiplication before division" way
$8 \div 4 \times 2$	$8 \div 4 \times 2$
$(8 \div 4) \times 2$	$8 \div (4 \times 2)$
2×2	$8 \div 8$
4	1

I decided to simplify from left to right.

First I did 8 divided by 4, and I got 2.

Then I multiplied 2 times 2, and I got 4.

I decided to do multiplication first.

First I multiplied 4 times 2, and I got 8.

Then I did 8 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?**

Which is correct?

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

Alex's "simplify from left to right" way

Morgan's "multiplication before division" way

$8 \div 4 \times 2$

$8 \div 4 \times 2$

I decided to simplify from left right.

ded to ify from right ft.

Hey Morgan, what did we learn from comparing these right and wrong ways?

First I by 4, an

4 got

When simplifying expressions with multiplication and division, perform the operations in order from left to right:

1. First, simplify expressions in parentheses.
2. Second, apply exponents.
3. Third, do all multiplication and division from left to right.
4. Fourth, do all addition and subtraction from left to right.

*** How did Alex**
*** How did Morg simplify the**
*** Which answer is correct, Alex's**
*** What are some similarities and bet d M s?**
*** Why did Morgan get the wrong**
*** Can you state a general rule tha scribes what y learned from paring Alex's and Morgan's ways of simplifying this expression?**

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?

4 Why did Morgan get the wrong answer?

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?

Which is correct?

Alex and Morgan were asked to simplify 3×2^2

Alex's "perform operations with exponents first" way

Morgan's "left to right" way

First I took 2 to the second power, and I got 4.

Then I multiplied 3 times 4, and I got 12.

3×2^2

$\downarrow$

3×4

$\downarrow$

12

3×2^2

$\downarrow$

6^2

$\downarrow$

36

First I multiplied 3 times 2, and I got 6.

Then I took 6 to the second power, and I got 36.

*** 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?**

Which is correct?

Alex and Morgan were asked to simplify 3×2^2

Alex's "perform operations with exponents first" way

Morgan's "left to right" way

First I took 2 to the second power and I got 4.

Then I multiplied

First I multiplied 3 times 2, and I got 6.

6 to

Hey Alex, what did we learn from comparing these right and wrong ways?

When an expression contains a mix of operations, perform the operations in accordance with the rules for the order of operations: :

1. First, simplify expressions in parentheses.
2. Second, apply exponents.
3. Third, do all multiplication and division from left to right.
4. Fourth, do all addition and subtraction from left to right.

*** Ho**
ar **rect,**
*** What are some si**
*** In thinking about**
what conclusions c **w ab**

Which
nd Morgan's wa ?
and Morgan's ways,
mplify **f expression?**

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 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?