Which is correct?

Alex and Morgan were asked to simplify $\frac{5}{x+2}+\frac{x}{x+3}$

Alex's "add the numerators and the denominators" way

$$\frac{5}{x+2}+\frac{x}{x+3}$$

$$\downarrow$$

$$\frac{5+x}{2x+5}$$

I added the numerator plus the numerator and the denominator plus the denominator. Here is my answer.

Morgan's "find a common denominator" way

$$\frac{5}{x+2}+\frac{x}{x+3}$$

$$\downarrow$$

$$\frac{}{(x+2)(x+3)}+\frac{}{(x+2)(x+3)}$$

First I found a common denominator.

$$\downarrow$$

$$\frac{5(x+3)}{(x+2)(x+3)}+\frac{x(x+2)}{(x+2)(x+3)}$$

Then I multiplied to find the values for the numerators.

$$\downarrow$$

$$\frac{5x+15}{(x+2)(x+3)}+\frac{x^2+2x}{(x+2)(x+3)}$$

I used the distributive property to expand the expression in the numerator of each term.

$$\downarrow$$

$$\frac{5x+15+x^2+2x}{(x+2)(x+3)}$$

I added the terms.

$$\downarrow$$

$$\frac{x^2+7x+15}{x^2+5x+6}$$

I combined like terms in the numerator to simplify the expression. Here is my answer.

*** 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?**
*** 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 $\frac{5}{x+2}+\frac{x}{x+3}$

Alex's "add the numerators and the denominators" way

Morgan's "find a common denominator" way

$\frac{x}{\quad+3}$ $+\frac{x}{x}$

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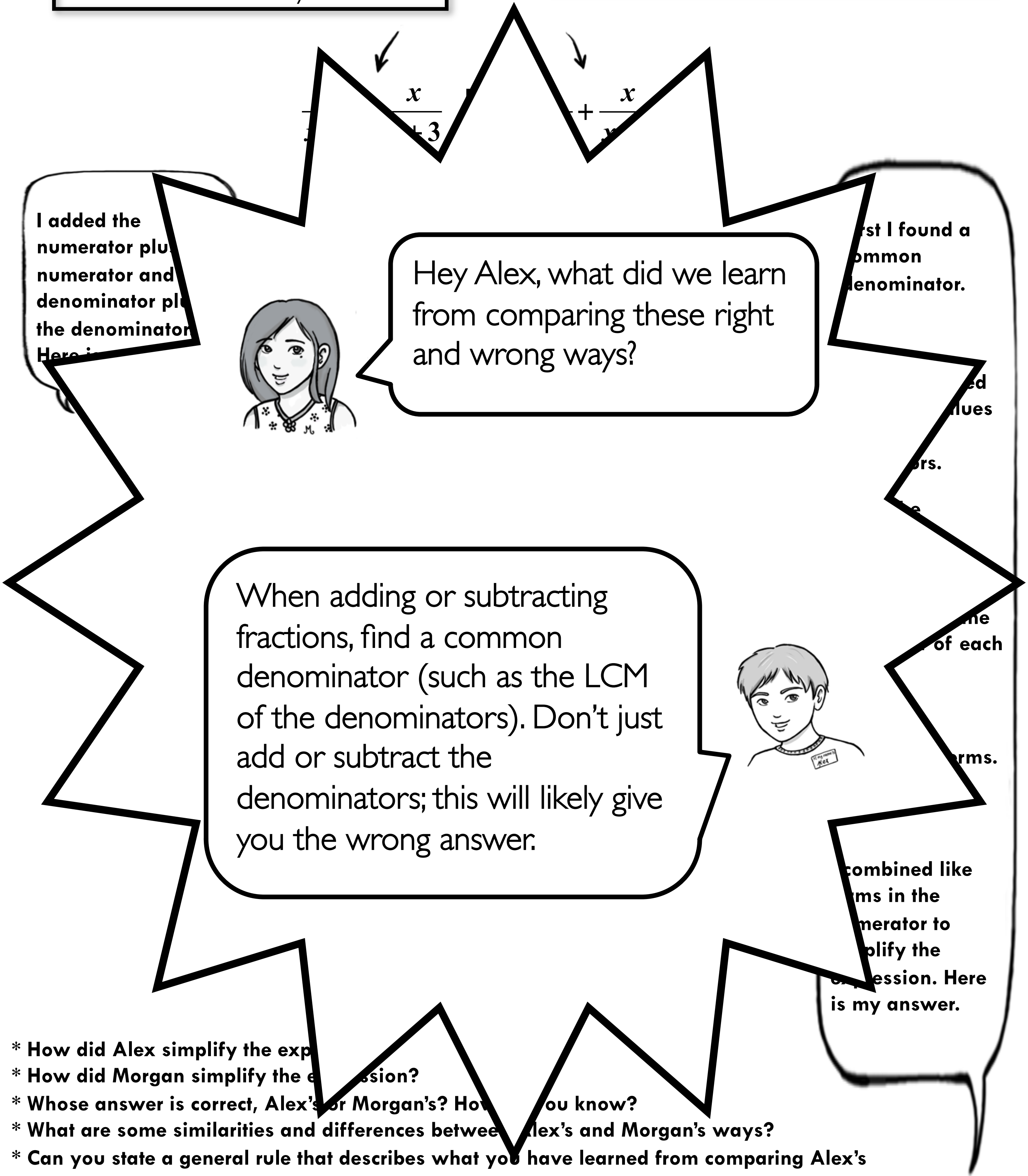


ombined like ms in the merator to plify the ession. Here is my answer.

- **How did Alex simplify the exp**
- **How did Morgan simplify the e ssion?**
- **Whose answer is correct, Alex's or Morgan's? How ou know?**
- **What are some similarities and differences betwee lex's and Morgan's ways?**
- **Can you state a general rule that describes what you have learned from comparing Alex's and Morgan's ways of simplifying this expression?**

Student Worksheet 11.1.1

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 Can you state a general rule that describes what you have learned from comparing Alex's and Morgan's ways?

Which is better?

Alex and Morgan were asked to simplify $\frac{6}{2x^2} - \frac{3}{3x^2}$

Alex's "find a common denominator first" way

$$\frac{6}{2x^2} - \frac{3}{3x^2}$$

$$\downarrow$$

First I found a common denominator.

$$\frac{}{6x^2} - \frac{}{6x^2}$$

$$\downarrow$$

I found the number that the denominator of each term must be multiplied by to get the common denominator. Then I multiplied the numerator of each term by this number to get the new numerators.

$$\frac{18}{6x^2} - \frac{6}{6x^2}$$

$$\downarrow$$

I subtracted 18 minus 6, and I got 12.

$$\frac{12}{6x^2}$$

$$\downarrow$$

I simplified my expression. Here is my answer.

$$\frac{2}{x^2}$$

Morgan's "simplify each term first" way

$$\frac{6}{2x^2} - \frac{3}{3x^2}$$

$$\downarrow$$

First I simplified each term.

$$\frac{3}{x^2} - \frac{1}{x^2}$$

$$\downarrow$$

Then I subtracted 3 minus 1 to get 2 in the numerator. Here is my answer.

$$\frac{2}{x^2}$$

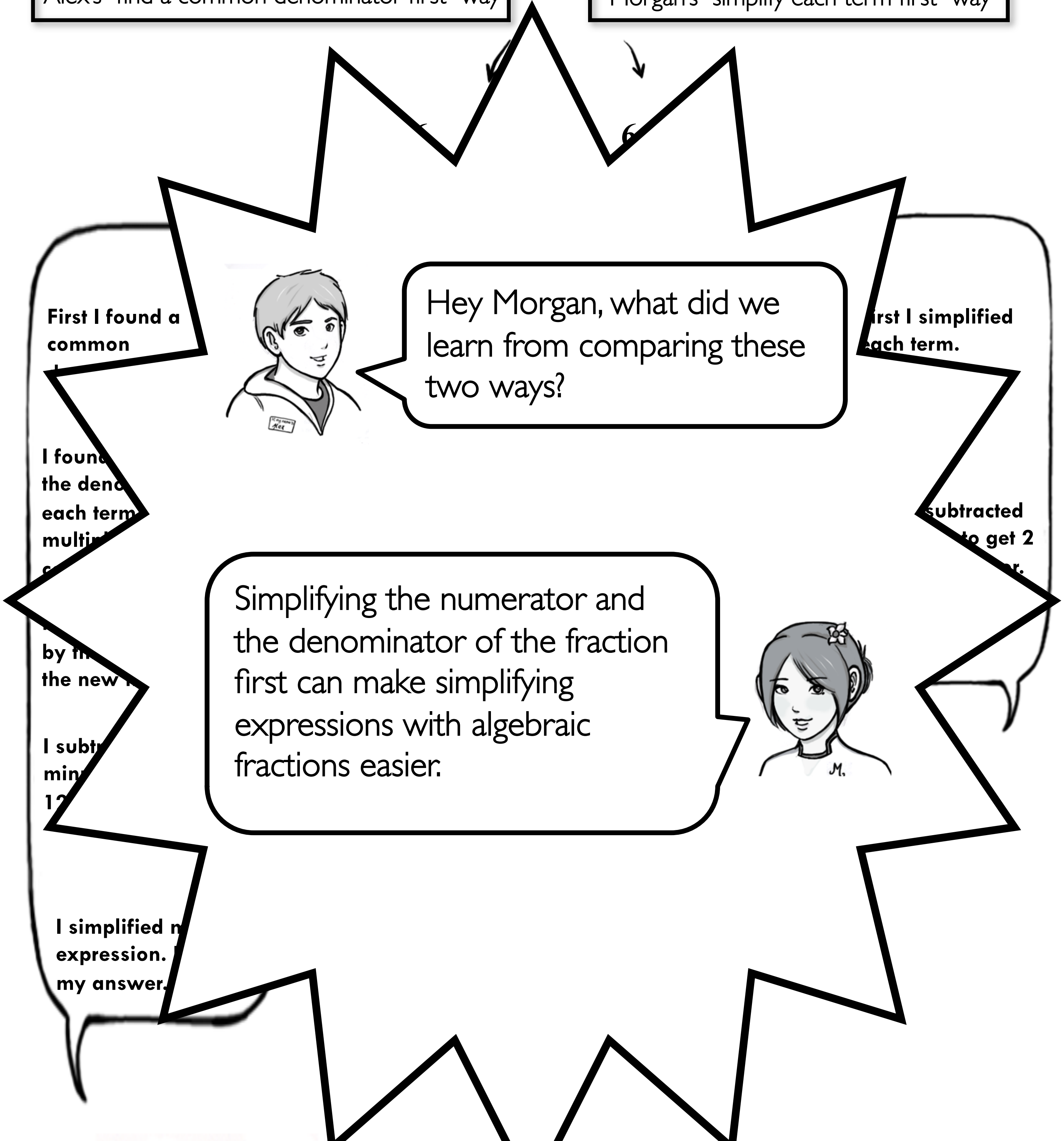
*** How did Alex simplify the expression?**
*** How did Morgan simplify the expression?**
*** What are some similarities and differences between Alex's and Morgan's ways?**
*** On a timed test, would you rather use Alex's way or Morgan's way? Why?**

Which is better?

Alex and Morgan were asked to simplify $\frac{6}{2x^2} - \frac{3}{3x^2}$

Alex's "find a common denominator first" way

Morgan's "simplify each term first" way



*** How did Alex simplify the expression?**
*** How did Morgan simplify the expression?**
*** What are some similarities and differences between Alex's and Morgan's ways?**
*** On a timed test, would you rather use Alex's way or Morgan's way? Why?**

11.1.2

Student Worksheet 11.1.2

1a How did Alex simplify the expression?

1b How did Morgan simplify the expression?

2 What are some similarities and differences between Alex's and Morgan's ways?

3 On a timed test, would you rather use Alex's way or Morgan's way? Why?

Which is correct?

Alex and Morgan were asked to simplify $\dfrac{x^2+6x+9}{x+3}=10$

Alex's "cross-multiply first" way

$$\frac{x^2+6x+9}{x+3}=10$$

↓

First I cross-multiplied.

$$x^2+6x+9=10(x+3)$$

↓

I distributed on the right-hand side.

$$x^2+6x+9=10x+30$$

↓

I subtracted on either side of the equation to solve for zero.

$$\begin{array}{r} x^2+6x+9=10x+30 \\ -10x-30\quad -10x-30 \\ \hline x^2-4x-21=0 \end{array}$$

↓

I factored the expression on the left.

$$(x-7)(x+3)=0$$

↓

Here is my answer. I did not include -3 because it makes the denominator equal to zero.

$$x=7, x=-\cancel{3}$$

Morgan's "'cancel' first" way

$$\frac{\overset{x}{\cancel{x}^2}+\overset{2x}{\cancel{6}x}+\overset{3}{\cancel{9}}}{\cancel{x}+\cancel{3}}=10$$

First I simplified the expression on the left. I did x^2 divided by x equals x, $6x$ divided by 3 equals $2x$, and 9 divided by 3 equals 3.

↓

$$x+2x+3=10$$

↓

Then I combined like terms.

$$3x+3=10$$

↓

I subtracted 3 on either side of the equation.

$$\begin{array}{r} 3x+3=10 \\ -3\quad -3 \\ \hline 3x=7 \end{array}$$

↓

Then I divided by 3 on both sides. Here is my answer.

$$\frac{3x}{3}=\frac{7}{3}$$

↓

$$x=\frac{7}{3}$$

- **How did Alex solve the equation?**
- **How did Morgan solve the equation?**
- **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?**
- **Can you state a general rule that describes what you have learned from comparing Alex's and Morgan's ways?**

Which is correct?

Alex and Morgan were asked to simplify $\dfrac{x^2+6x+9}{x+3}=10$

Alex's "cross-multiply first" way

Morgan's "'cancel' first" way

x^2

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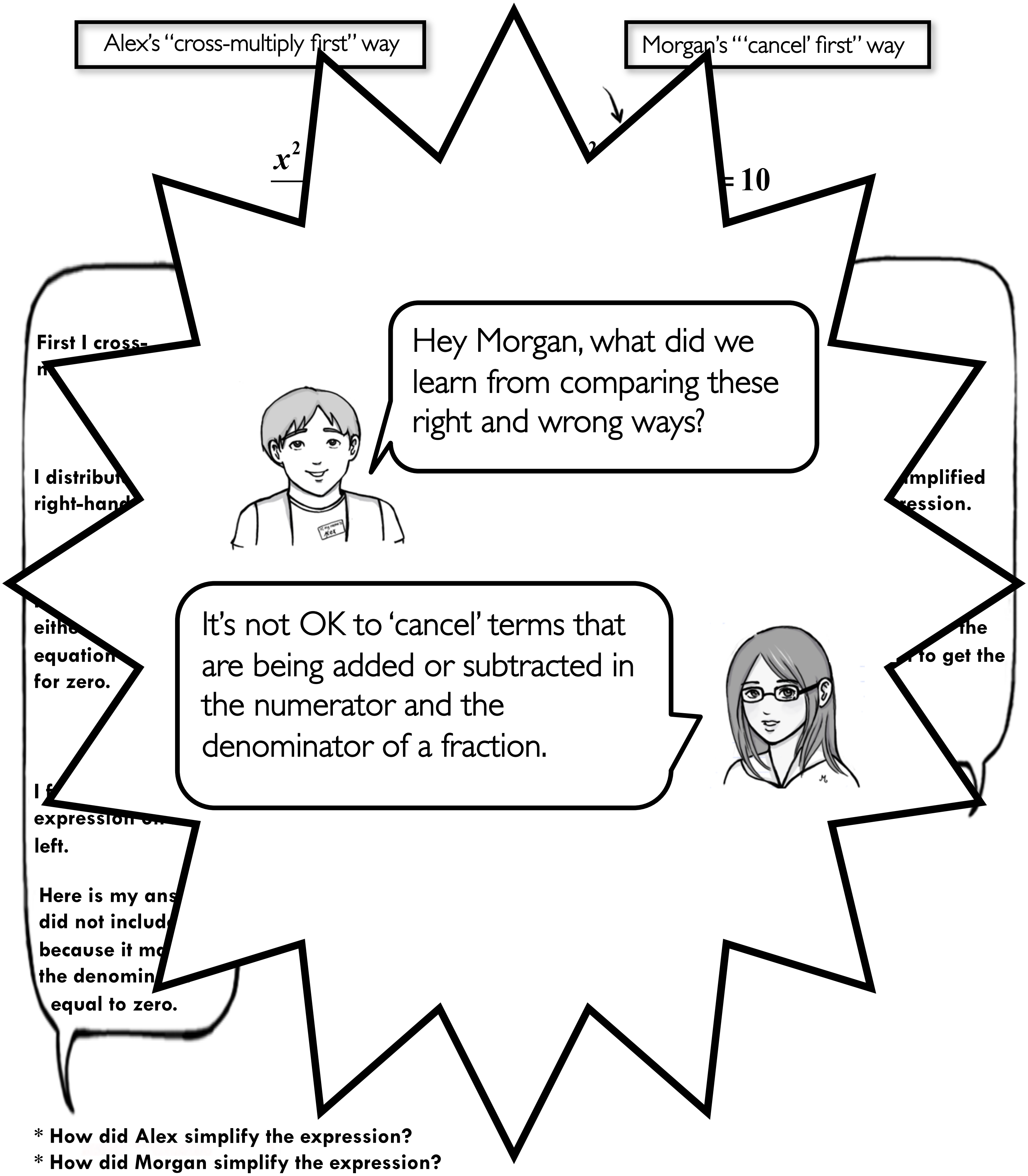

*** How did Alex simplify the expression?**
*** How did Morgan simplify the expression?**
*** Whose answer is correct, Alex's or Morgan's? How do you know?**
*** What are some similarities and differences between Alex's and Morgan's ways?**
*** Can you state a general rule that describes what you have learned from comparing Alex's and Morgan's ways?**

Student Worksheet 11.2.1

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 Can you state a general rule that describes what you have learned from comparing Alex's and Morgan's ways of solving this equation?

Why does it work?

Alex and Morgan were asked to simplify $\frac{7}{a} \div \frac{b}{c}$

Alex's "divide first" way

$$\frac{7}{a} \div \frac{b}{c}$$

$$\downarrow$$

First I rewrote the division problem in fraction notation.

$$\frac{\frac{7}{a}}{\frac{b}{c}}$$

$$\downarrow$$

Then I multiplied the numerator and the denominator by the reciprocal of the denominator, *c/b*. The terms in the denominator canceled out.

$$\frac{\frac{7}{a} \cdot \frac{c}{b}}{\frac{b}{\cancel{c}} \cdot \frac{\cancel{c}}{b}}$$

$$\downarrow$$

I multiplied the terms in the numerator to get my answer.

$$\frac{7c}{ab}$$

Morgan's "multiply by the reciprocal" way

$$\frac{7}{a} \div \frac{b}{c}$$

$$\downarrow$$

First I rewrote the problem as multiplication by the reciprocal of *b/c*, which is *c/b*.

$$\frac{7}{a} \cdot \frac{c}{b}$$

$$\downarrow$$

I multiplied the terms in the numerator and denominator together, and I got my answer.

$$\frac{7c}{ab}$$

*** How did Alex simplify the expression?**
*** How did Morgan simplify the expression?**
*** Why do the terms in the denominator cancel out in Alex's second step?**
*** What are some similarities and differences between Alex's and Morgan's ways?**
*** Even though Alex and Morgan did different first steps, why did they both get the same answer?**

Why does it work?

Alex and Morgan were asked to simplify $\frac{7}{a} \div \frac{b}{c}$

Alex's "divide first" way

Morgan's "multiply by the reciprocal" way

$$\frac{7}{a} \div \frac{b}{c} \qquad \frac{7}{a} \div \frac{b}{c}$$

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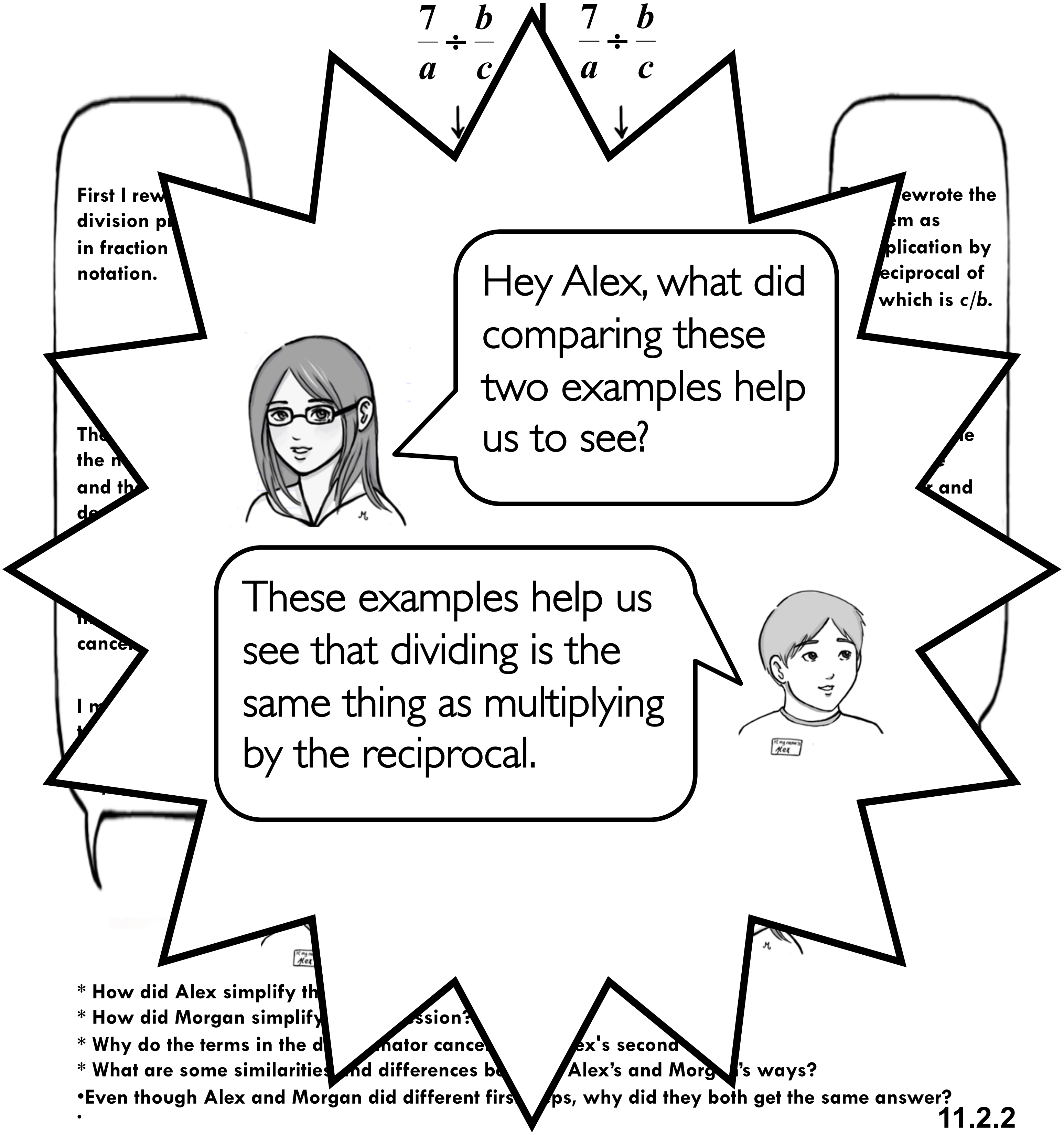

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Student Worksheet 11.2.2

1a How did Alex simplify the expression?

1b How did Morgan simplify the expression?

2 Why do the terms in the denominator cancel out in Alex's second step?

3 What are some similarities and differences between Alex's and Morgan's *ways*?

4 Even though Alex and Morgan did different first steps, why did they both get the same answer?