Lesson 8: Linear Equations in Disguise

Classwork

Example 3

Can this equation be solved?

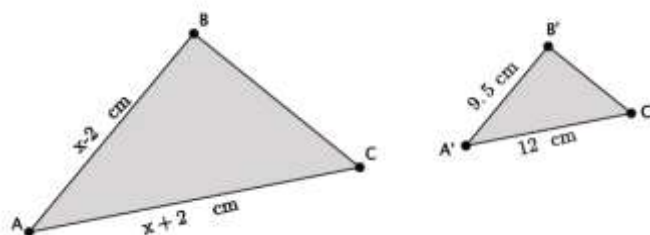$$\frac{6 + x}{7x + \frac{2}{3}} = \frac{3}{8}$$

Example 4

Can this equation be solved?

$$\frac{7}{3x + 9} = \frac{1}{8}$$

Example 5

In the diagram below, $\triangle ABC \sim \triangle A'B'C'$. Using what we know about similar triangles, we can determine the value of x.

Exercises

Solve the following equations of rational expressions, if possible.

1. $\dfrac{2x+1}{9} = \dfrac{1-x}{6}$

2. $\dfrac{5+2x}{3x-1} = \dfrac{6}{7}$

3. $\dfrac{x+9}{12} = \dfrac{-2x-\frac{1}{2}}{3}$

4. $\dfrac{8}{3-4x} = \dfrac{5}{2x+\frac{1}{4}}$

Lesson Summary

Proportions are linear equations in disguise and are solved the same way we normally solve proportions.

When multiplying a fraction with more than one term in the numerator and/or denominator by a number, put the expressions with more than one term in parentheses so you remember to use the distributive property when transforming the equation. For example:

$$\frac{x+4}{2x-5} = \frac{3}{5}$$
$$5(x+4) = 3(2x-5)$$

The equation $5(x+4) = 3(2x-5)$ is now clearly a linear equation and can be solved using the properties of equality.

Problem Set

Solve the following equations of rational expressions, if possible. If it cannot be solved, explain why.

1. $\dfrac{5}{6x-2} = \dfrac{-1}{x+1}$

2. $\dfrac{4-x}{8} = \dfrac{7x-1}{3}$

3. $\dfrac{3x}{x+2} = \dfrac{5}{9}$

4. $\dfrac{\frac{1}{2}x+6}{3} = \dfrac{x-3}{2}$

5. $\dfrac{7-2x}{6} = \dfrac{x-5}{1}$

6. $\dfrac{2x+5}{2} = \dfrac{3x-2}{6}$

7. $\dfrac{6x+1}{3} = \dfrac{9-x}{7}$

8. $\dfrac{\frac{1}{3}x-8}{12} = \dfrac{-2-x}{15}$

9. $\dfrac{3-x}{1-x} = \dfrac{3}{2}$

10. In the diagram below, $\triangle ABC \sim \triangle A'B'C'$. Determine the lengths of AC and BC.