Lesson 5: The Zero Product Property

Classwork

Opening Exercise

Consider the equation . What values of , , , and would make the equation true?

Exercises 1–4

Find values of and that satisfy each of the following equations. (There may be more than one correct answer.)



**Example 1**

For each of the related questions below, use what you know about the zero product property to find the answers.

* 1. The area of a rectangle can be represented by the expression . If the dimensions of the rectangle are known to be the linear factors of the expression, write each dimension of this rectangle as a binomial. Write the area in terms of the product of the two binomials.
  2. Draw and label a diagram that represents the rectangle’s area.
  3. Suppose the rectangle’s area is square units. Can you find the dimensions of the rectangle?
  4. Rewrite the equation so that it is equal to zero and solve.
  5. What are the actual dimensions of the rectangle?
  6. A smaller rectangle can fit inside the first rectangle, and it has an area that can be represented by the expression . If the dimensions of the rectangle are known to be the linear factors of the expression, what are the dimensions of the smaller rectangle in terms of ?
  7. What value for would make the smaller rectangle have an area of that of the larger?

Exercises 5–8

Solve. Show your work.

**Zero Product Property**

**If , then or or .**

Lesson Summary

When solving for the variable in a quadratic equation, rewrite the quadratic expression in factored form and set equal to zero. Using the zero product property, you know that if one factor is equal to zero, then the product of all factors is equal to zero.

Going one step further, when you have set each binomial factor equal to zero and have solved for the variable, all of the possible solutions for the equation have been found. Given the context, some solutions may not be viable, so be sure to determine if each possible solution is appropriate for the problem.

Problem Set

Solve the following equations.

2. Write an equation (in factored form) that has solutions of or .
3. Write an equation (in factored form) that has solutions of or .
4. Quinn looks at the equation and says that since the equation is in factored form it can be solved as follows:

Explain to Quinn why this is incorrect. Show her the correct way to solve the equation.