Lesson 1.3.7: Zero Product Property

Targets:

1. I can use the "Zero Product Property" to solve equations.
2. I can factor equations to help solve them.

Warm Up

Solve for x in the following equations:

1. $3x = 0$
2. $x(3x) = 0$ (hint: do not distribute)

Zero Product Property

Watch the video and take notes here:

1. **Definition of Zero Product Property**: If two numbers a and b are multiplied together and the resulting product is 0, then _____.

    a. If $a \cdot b = 0$

    b. Then $a = 0$ *or* $b = 0$ *... or both* $a = 0$ *and* $b = 0$

    c. Solve $x(x - 3) = 0$

2. Solve each equation:

    a. $4x(x + 5) = 0$

    b. $(x - 2)(x + 7) = 0$

    c. $(2x + 3)(5x - 1) = 0$

    d. $x(x - 1)(6x + 11) = 0$

Practice 1

1. Solve each equation for x:

    a. $x - 10 = 0$

    b. $\frac{x}{2} + 20 = 0$

2. Demanding Dwight insists that you give him two solutions to the following equation. Use the Zero Product Property to do so. $(x - 10)(\frac{x}{2} + 20) = 0$

3. Demanding Dwight now wants FIVE solutions to the following equation. Can you provide them?

$$(x - 10)(2x + 6)(x^2 - 36)(x^2 + 10)(\tfrac{x}{2} + 20) = 0$$

Practice 2

Consider the equation: $(x-4)(x+3)=0$

a. Rewrite the equation as a compound statement.

b. Find the two solutions to the equation.

Practice 3

Solve the following equation for x. In order to solve for x, your first step must be to factor. What can you take out of each monomial?

$$2x^2-10x=0$$

Practice 4

Solve this equation for x: $x(x-3)+5(x-3)=0$

Exit Ticket

Solve each equation for x:

1. $(x+1)(x+2)=0$
2. $(3x-2)(x+12)=0$
3. $(x-3)(x-3)=0$
4. $(x+4)(x-6)(x-10)=0$
5. $x^2-6x=0$
6. $x(x-5)+4(x-5)=0$