

# Unit 7 Lesson 9: Solving Quadratic Equations by Using Factored Form

## 1 Why Would You Do That? (Warm up)

### Student Task Statement

Let's try to find at least one solution to  $x^2 - 2x - 35 = 0$ .

1. Choose a whole number between 0 and 10.
2. Evaluate the expression  $x^2 - 2x - 35$ , using your number for  $x$ .
3. If your number doesn't give a value of 0, look for someone in your class who may have chosen a number that does make the expression equal 0. Which number is it?
4. There is another number that would make the expression  $x^2 - 2x - 35$  equal 0. Can you find it?

## 2 Let's Solve Some Equations!

### Student Task Statement

1. To solve the equation  $n^2 - 2n = 99$ , Tyler wrote out the following steps. Analyze Tyler's work. Write down what Tyler did in each step.

$$n^2 - 2n = 99 \quad \text{Original equation}$$

$$n^2 - 2n - 99 = 0 \quad \text{Step 1}$$

$$(n - 11)(n + 9) = 0 \quad \text{Step 2}$$

$$n - 11 = 0 \quad \text{or} \quad n + 9 = 0 \quad \text{Step 3}$$

$$n = 11 \quad \text{or} \quad n = -9 \quad \text{Step 4}$$

2. Solve each equation by rewriting it in factored form and using the zero product property. Show your reasoning.

a.  $x^2 + 8x + 15 = 0$

b.  $x^2 - 8x + 12 = 5$

c.  $x^2 - 10x - 11 = 0$

d.  $49 - x^2 = 0$

e.  $(x + 4)(x + 5) - 30 = 0$

### 3 Revisiting Quadratic Equations with Only One Solution

#### Student Task Statement

1. The other day, we saw that a quadratic equation can have 0, 1, or 2 solutions. Sketch graphs that represent three quadratic functions: one that has no zeros, one with 1 zero, and one with 2 zeros.
2. Use graphing technology to graph the function defined by  $f(x) = x^2 - 2x + 1$ . What do you notice about the  $x$ -intercepts of the graph? What do the  $x$ -intercepts reveal about the function?
3. Solve  $x^2 - 2x + 1 = 0$  by using the factored form and zero product property. Show your reasoning. What solutions do you get?
4. Write an equation to represent another quadratic function that you think will only have one zero. Graph it to check your prediction.