Unit 3 Lesson 16: Solving Quadratics

1 Find the Perfect Squares (Warm up)

Student Task Statement

The expression $x^2 + 8x + 16$ is equivalent to $(x + 4)^2$. Which expressions are equivalent to $(x + n)^2$ for some number n?

1. $x^2 + 10x + 25$
2. $x^2 + 10x + 29$
3. $x^2 - 6x + 8$
4. $x^2 - 6x + 9$

2 Different Ways to Solve It (Optional)

Student Task Statement

Elena and Han solved the equation $x^2 - 6x + 7 = 0$ in different ways.

Elena said, “First I added 2 to each side:

$$x^2 - 6x + 7 + 2 = 2$$

So that tells me:

$$(x - 3)^2 = 2$$

I can find the square roots of both sides:

$$x - 3 = \pm\sqrt{2}$$

Which is the same as:

$$x = 3 \pm \sqrt{2}$$

So the two solutions are $x = 3 + \sqrt{2}$ and $x = 3 - \sqrt{2}$.”

Han said, “I used the quadratic formula:

$$x = \frac{\text{-}b \pm \sqrt{b^2 - 4 \cdot a \cdot c}}{2 \cdot a}$$

Since $x^2 - 6x + 7 = 0$, that means $a = 1$, $b = \text{-}6$, and $c = 7$. I know:

$$x = \frac{6 \pm \sqrt{36 - 4 \cdot 1 \cdot 7}}{2 \cdot 1}$$

or

$$x = \frac{6 \pm \sqrt{8}}{2}$$

So:

$$x = 3 \pm \frac{\sqrt{8}}{2}$$

I think the solutions are $x = 3 + \frac{\sqrt{8}}{2}$ and $x = 3 - \frac{\sqrt{8}}{2}$.”

Do you agree with either of them? Explain your reasoning.

3 Solve These Ones (Optional)

Student Task Statement

Solve each quadratic equation with the method of your choice. Be prepared to compare your approach with a partner's.

1. $x^2 = 100$
2. $x^2 = 38$
3. $x^2 - 10x + 25 = 0$
4. $x^2 + 14x + 40 = 0$
5. $x^2 + 14x + 39 = 0$
6. $3x^2 - 5x - 11 = 0$