Unit 7 Lesson 11: What are Perfect Squares?

1 The Thing We Are Squaring (Warm up)

Student Task Statement

In each equation, what expression could be substituted for a so the equation is true for all values of x?

1. $x^2 = a^2$

2. $(3x)^2 = a^2$

3. $a^2 = 7x \cdot 7x$

4. $25x^2 = a^2$

5. $a^2 = \frac{1}{4}x^2$

6. $a^2 = (x + 1)^2$

7. $(2x - 9)(2x - 9) = a^2$

2 Perfect Squares in Different Forms

Student Task Statement

1. Each expression is written as the product of factors. Write an equivalent expression in standard form.

   a. $(3x)^2$

   b. $7x \cdot 7x$

   c. $(x + 4)(x + 4)$

   d. $(x + 1)^2$

   e. $(x - 7)^2$

   f. $(x + n)^2$

2. Why do you think the following expressions can be described as **perfect squares**?

$$x^2 + 6x + 9 \qquad x^2 - 16x + 64 \qquad x^2 + \tfrac{1}{3}x + \tfrac{1}{36}$$

3 Two Methods

Student Task Statement

Han and Jada solved the same equation with different methods. Here they are:

Han's method: Jada's method:

$$(x - 6)^2 = 25$$
$$(x - 6)(x - 6) = 25$$
$$x^2 - 12x + 36 = 25$$
$$x^2 - 12x + 11 = 0$$
$$(x - 11)(x - 1) = 0$$

$$x = 11 \quad \text{or} \quad x = 1$$

$$(x - 6)^2 = 25$$

$$x - 6 = 5 \quad \text{or} \quad x - 6 = \text{-}5$$
$$x = 11 \quad \text{or} \quad x = 1$$

Work with a partner to solve these equations. For each equation, one partner solves with Han's method, and the other partner solves with Jada's method. Make sure both partners get the same solutions to the same equation. If not, work together to find your mistakes.

$$(y - 5)^2 = 49$$

$$(x + 4)^2 = 9$$

$$(z + \tfrac{1}{3})^2 = \tfrac{4}{9}$$

$$(v - 0.1)^2 = 0.36$$