

Unit 3 Lesson 17: Completing the Square and Complex Solutions

1 Creating Quadratic Equations (Warm up)

Student Task Statement

Match each equation in standard form to its factored form and its solutions.

1. $x^2 - 25 = 0$

• $(x - 5i)(x + 5i) = 0$

• $\sqrt{5}, -\sqrt{5}$

2. $x^2 - 5 = 0$

• $(x - 5)(x + 5) = 0$

• $5, -5$

3. $x^2 + 25 = 0$

• $(x - \sqrt{5})(x + \sqrt{5}) = 0$

• $5i, -5i$

2 Sometimes the Solutions Aren't Real Numbers

Student Task Statement

What are the solutions to these equations?

1. $(x - 5)^2 = 0$

2. $(x - 5)^2 = 1$

3. $(x - 5)^2 = -1$

3 Finding Complex Solutions

Student Task Statement

Solve these equations by completing the square.

1. $x^2 - 8x + 13 = 0$

2. $x^2 - 8x + 19 = 0$

4 Can You See the Solutions on a Graph? (Optional)

Student Task Statement

1. How many real solutions does each equation have? How many non-real solutions?

a. $x^2 - 8x + 13 = 0$

b. $x^2 - 8x + 16 = 0$

c. $x^2 - 8x + 19 = 0$

2. How do the graphs of these functions help us answer the previous question?

a. $f(x) = x^2 - 8x + 13$

b. $g(x) = x^2 - 8x + 16$

c. $h(x) = x^2 - 8x + 19$