## 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. $x^{2}−25=0$
2. $x^{2}−5=0$
3. $x^{2}+25=0$
* $\left(x−5i\right)\left(x+5i\right)=0$
* $\left(x−5\right)\left(x+5\right)=0$
* $\left(x−\sqrt{5}\right)\left(x+\sqrt{5}\right)=0$
* $\sqrt{5}$, $-\sqrt{5}$
* 5, -5
* $5i$, ​​​​$-5i$

### 2 Sometimes the Solutions Aren't Real Numbers

#### Student Task Statement

What are the solutions to these equations?

1. $\left(x−5\right)^{2}=0$
2. $\left(x−5\right)^{2}=1$
3. $\left(x−5\right)^{2}=-1$

### 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?
	1. $x^{2}−8x+13=0$
	2. $x^{2}−8x+16=0$
	3. $x^{2}−8x+19=0$
2. How do the graphs of these functions help us answer the previous question?
	1. $f\left(x\right)=x^{2}−8x+13$
	2. $g\left(x\right)=x^{2}−8x+16$
	3. $h\left(x\right)=x^{2}−8x+19$



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