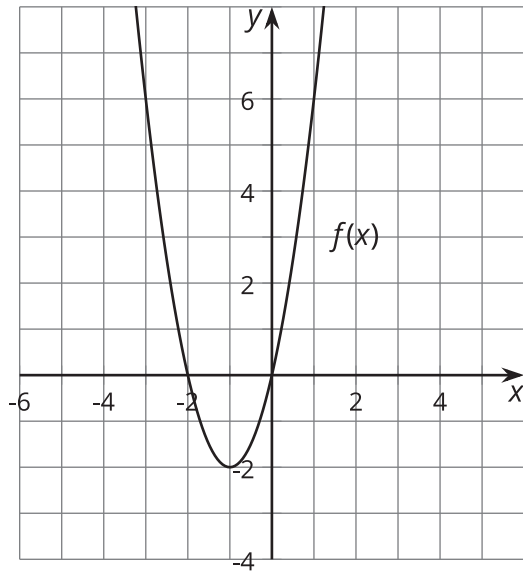# Unit 3 Lesson 19: Real and Non-Real Solutions

1 Notice and Wonder: Where Is It 0? (Warm up)
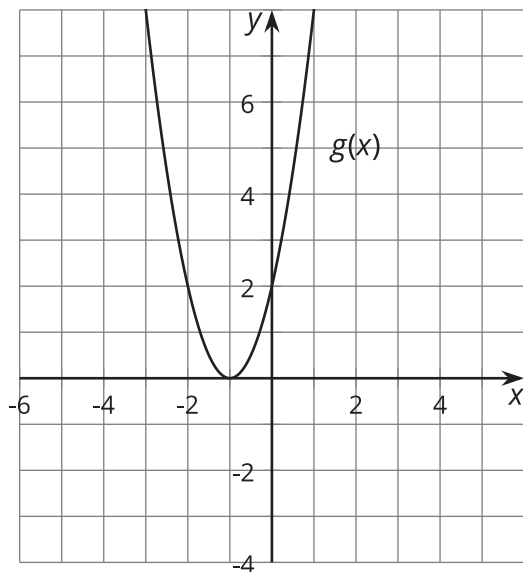
Student Task Statement

What do you notice? What do you wonder?
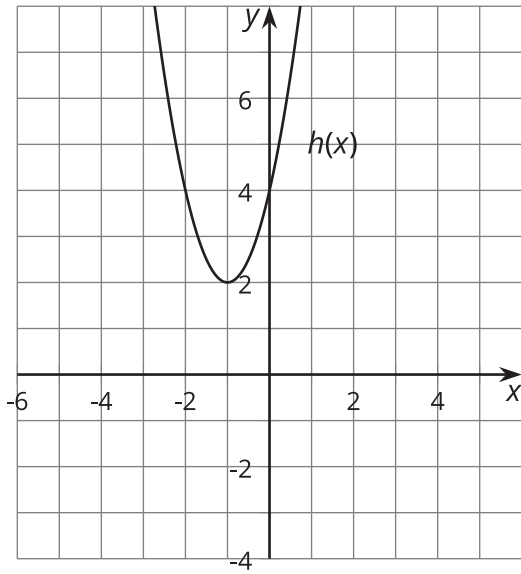
$f(x) = 2x^2 + 4x$

$f(x) = 0$ when $x = 0, -2$.

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

$g(x) = 0$ when $x = -1$.

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

$h(x) = 0$ when $x = \text{-}1 + i, \text{-}1 - i$.

2 Real or Not? (Optional)

Student Task Statement

Here are some equations:

Equation	Prediction
$x^2 - 6x + 5 = 0$	
$x^2 - 6x + 13 = 0$	
$-x^2 + 6x - 9 = 0$	
$-x^2 - 9 = 0$	

1. Which equations will have real solutions, and which ones will not? Write your prediction in the table.
   Pause here for discussion.

2. What advice would you give to someone who is trying to figure out whether a quadratic equation has real solutions?

3 Make Your Own (Optional)

Student Task Statement

1. Create three different quadratic equations. At least one should have solutions with an imaginary part, and at least one should have solutions with only real parts.

2. Solve your equations. Write down your equations and their solutions in the table.

Equation	Solutions