UNIT 3 • MODELING AND ANALYZING QUADRATIC FUNCTIONS
Lesson 1: Creating and Solving Quadratic Equations in One Variable

Instruction

Lesson 3.1.1: Taking the Square Root of Both Sides

Georgia Standards of Excellence

MGSE9–12.A.CED.1★

MGSE9–12.A.REI.4

MGSE9–12.A.REI.4b

Warm-Up 3.1.1 Debrief

1. How far is the base of the ladder from the house?

   Use the Pythagorean Theorem to find how far the ladder is from the house. Let a represent the distance from the base of the ladder to the base of the house. Let b represent the base of the house to the point where the ladder reaches the house. Let c represent the length of the ladder.

$a^2 + b^2 = c^2$	Pythagorean Theorem
$a^2 + (14)^2 = (16)^2$	Substitute values for b and c.
$a^2 + 196 = 256$	Simplify.
$a^2 = 60$	Subtract 196 from both sides of the equation.
$a = \sqrt{60} = 2\sqrt{15} \approx 7.75$ feet	Take the principal square root of 60, since all lengths are positive.

   The base of the ladder is about 7.75 feet from the house.

2. Suppose the ladder is moved 2 feet closer to the house. Now how far up the side of the house does the ladder reach?

   Again, use the Pythagorean Theorem to find how far up the side of the house the ladder reaches.

$a^2 + b^2 = c^2$	Pythagorean Theorem
$(7.75 - 2)^2 + (b)^2 = (16)^2$	Substitute values for a and c.
$5.75^2 + b^2 = 256$	Simplify.
$b^2 \approx 222.94$	Square 5.75 and subtract this value from 256.
$b \approx 14.94$ feet	Take the principal square root of 222.94, since all lengths are positive.

   The ladder reaches about 14.94 feet up the side of the house.

UNIT 3 • MODELING AND ANALYZING QUADRATIC FUNCTIONS
Lesson 1: Creating and Solving Quadratic Equations in One Variable

Instruction

Connection to the Lesson

- Students will use square roots to solve quadratic equations.

- Students will build equations to represent problems in context.