

UNIT 1 • RELATIONSHIPS BETWEEN QUANTITIES AND EXPRESSIONS

Lesson 1: Working with Radicals and Properties of Real Numbers

Instruction

Lesson 1.1.1: Working with Radicals and Properties of Real Numbers

Georgia Standards of Excellence

MGSE9–12.N.RN.2

MGSE9–12.N.RN.3

Warm-Up 1.1.1 Debrief

1. What is the perimeter, in terms of s , of the triangle formed by two adjacent sides and the diagonal of the square?

To find the perimeter, add the lengths of the sides of the triangle. The sides of the triangle that lie on the square each have length s , while the diagonal has length $d = \sqrt{2} \cdot s$. The perimeter is therefore $s + s + \sqrt{2} \cdot s$, or $2s + \sqrt{2} \cdot s$.

2. What is the perimeter of the triangle if $s = 3$ feet? Round your answer to the nearest hundredth.

The perimeter is $2s + \sqrt{2} \cdot s$. Substitute $s = 3$ feet into this expression and simplify:

$$2s + \sqrt{2} \cdot s \quad \text{Expression for the perimeter}$$

$$= 2 \cdot (3) + \sqrt{2} \cdot (3) \quad \text{Substitute 3 for } s.$$

$$= 6 + 3\sqrt{2} \quad \text{Multiply.}$$

$$\approx 6 + 4.24 \quad \text{Simplify } 3\sqrt{2} \text{ using a calculator.}$$

$$\approx 10.24 \quad \text{Add.}$$

The perimeter of the triangle is approximately 10.24 feet.

Connection to the Lesson

- Students will develop a greater understanding of evaluating and simplifying expressions with radicals.
- Students will apply the order of operations to evaluate radical expressions that include other operations.
- Students will begin to investigate properties of rational and irrational numbers.