Parent Newsletter

Chapter 10: Square Root Functions and Geometry

Students will...

· Graph square root functions.
· Compare graphs of square root functions.
· Simplify radical expressions.
· Solve square root equations, including those with square roots on both sides.
· Identify extraneous solutions.
· Discover the Pythagorean Theorem.
· Find missing side lengths of right triangles.
· Identify right triangles.
· Find distances between two points.
· Solve real-life problems.

Standards

Common Core: 8.G.6, 8.G.7, 8.G.8, N.RN.2, F.IF.4, F.IF.7b

Essential Questions

· How can you sketch the graph of a square root function?
· How can you solve an equation that contains square roots?
· How are the lengths of the sides of a right triangle related?
· In what other ways can you use the Pythagorean Theorem?

In mathematics, a rule is called a *theorem*.

The *legs* of a right triangle are the two sides that form the right angle.

The *hypotenuse* of a right triangle is the side opposite the right angle.

You can use the *distance formula* to find the distance between any two points in a coordinate plane.

Key Terms

A *square root function* is a function that contains a square root with the independent variable in the radicand.

A radical expression is in **simplest form** when:
· no radicands have perfect square factors other than 1
· no radicands contain fractions
· no radicands appear in the denominator of a fraction

When a radicand in the denominator is not a perfect square, multiply the fraction by an appropriate form of 1 to eliminate the radical from the denominator. This process is called *rationalizing the denominator*.

The binomials $a\sqrt{b} + c\sqrt{d}$ and $a\sqrt{b} - c\sqrt{d}$ are called *conjugates*.

A *square root equation* is an equation that contains a square root with a variable in the radicand.

A solution of a transformed equation that is not a solution of the original equation is an *extraneous solution*.

Reference Tools

A Word Magnet can be used to organize information associated with a vocabulary term. Students write the term inside the magnet. Students write the associated information on the blank lines that "radiate" from the magnet.

Key Ideas

Square Root Function
A square root function is a function that contains a square root with the independent variable in the radicand. The most basic square root function is $y = \sqrt{x}$.
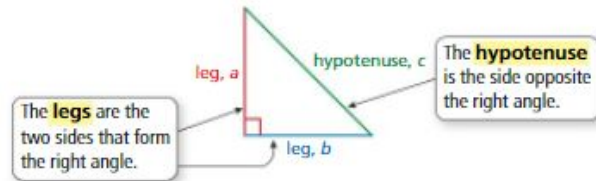
Squaring Each Side of an Equation
- If two expressions are equal, then their squares are also equal.
- If $a = b$, then $a^2 = b^2$.

Sides of a Right Triangle
The sides of a right triangle have special names.

The **legs** are the two sides that form the right angle.

leg, a

hypotenuse, c

The **hypotenuse** is the side opposite the right angle.

leg, b

The Pythagorean Theorem
- In any right triangle, the sum of the squares of the lengths of the legs is equal to the square of the length of the hypotenuse.
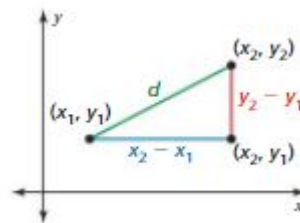- $a^2 + b^2 = c^2$

Converse of the Pythagorean Theorem
If the equation $a^2 + b^2 = c^2$ is true for the side lengths of a triangle, then the triangle is a right triangle.

Distance Formula
The distance d between any two points (x_1, y_1) and (x_2, y_2) is given by the formula
$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}.$$

Quick Review

- When graphing, remember $f(x) + k$ is a vertical translation of $f(x)$.

- The graph of $f(x - h)$ is a horizontal translation of $f(x)$.

- Rationalizing the denominator works because you multiply the numerator and denominator by the same nonzero number a, which is the same as multiplying by $\dfrac{a}{a}$, or 1.

- The product of conjugates is a rational number.

- In a right triangle, the legs are the shorter sides and the hypotenuse is always the longest side.

- A *Pythagorean triple* is a set of three positive integers a, b, and c, where $a^2 + b^2 = c^2$.

- When using the converse of the Pythagorean Theorem, always substitute the length of the longest side for c.

What's the Point?

The ability to add, subtract, or multiply polynomials is useful in real-life for finding the perimeter or area of figures such as gardens.

The STEM Videos available online show ways to use mathematics in real-life situations. The Chapter 7: Bird Dropping Food STEM Video is available online at www.bigideasmath.com.