BIG IDEAS

For Your Notebook

Using Rational Exponents

The following are properties of rational exponents. Let a and b be real numbers and let m and n be rational numbers.

Property	Example
$a^m \cdot a^n = a^{m+n}$	$4^{5/2} \cdot 4^{1/2} = 4^3 = 64$
$(a^m)^n = a^{mn}$	$(2^8)^{1/4} = 2^2 = 4$
$(ab)^m = a^m b^m$	$(25 \cdot 4)^{1/2} = 25^{1/2} \cdot 4^{1/2} = 5 \cdot 2 = 10$
$a^{-m} = \dfrac{1}{a^m}, a \neq 0$	$8^{-1/3} = \dfrac{1}{8^{1/3}} = \dfrac{1}{2}$
$\dfrac{a^m}{a^n} = a^{m-n}, a \neq 0$	$\dfrac{9^{5/8}}{9^{1/8}} = 9^{4/8} = 9^{1/2} = 3$
$\left(\dfrac{a}{b}\right)^m = \dfrac{a^m}{b^m}, b \neq 0$	$\left(\dfrac{16}{81}\right)^{1/4} = \dfrac{16^{1/4}}{81^{1/4}} = \dfrac{2}{3}$

Performing Function Operations and Finding Inverse Functions

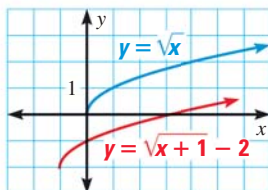| Operation	Definition	Example: $f(x) = 2x, g(x) = x - 5$
Addition	$h(x) = f(x) + g(x)$	$h(x) = 2x + (x - 5) = 3x - 5$
Subtraction	$h(x) = f(x) - g(x)$	$h(x) = 2x - (x - 5) = x + 5$
Multiplication	$h(x) = f(x) \cdot g(x)$	$h(x) = 2x(x - 5) = 2x^2 - 10x$
Division	$h(x) = \dfrac{f(x)}{g(x)}$	$h(x) = \dfrac{2x}{x - 5}$
Composition	$h(x) = g(f(x))$	$h(x) = 2x - 5$
Inverse	$h(x) = g^{-1}(x)$	$h(x) = x + 5$

Graphing Radical Functions and Solving Radical Equations

To **graph** radical functions, use the graph of the parent functions. For example, to graph $y = \sqrt{x + 1} - 2$, translate the graph of $y = \sqrt{x}$ left 1 unit and down 2 units.

To **solve** a radical equation, first isolate the radical. Then raise each side of the equation to the same power and solve the polynomial equation.

$\sqrt{2x - 5} - 3 = 2$	**Write equation.**
$\sqrt{2x - 5} = 5$	**Isolate radical.**
$(\sqrt{2x - 5})^2 = 5^2$	**Square each side.**
$2x - 5 = 25$	**Simplify.**
$x = 15$	**Solve.**