

## BIG IDEAS

## For Your Notebook

## Big Idea 1

TEKS 2A.6.B

## Graphing and Writing Quadratic Functions in Several Forms

You can graph or write a quadratic function in standard form, vertex form, or intercept form.

Form	Equation	Information about quadratic function
Standard form	$y = ax^2 + bx + c$	<ul style="list-style-type: none"> <li>The <math>x</math>-coordinate of the vertex is <math>-\frac{b}{2a}</math>.</li> <li>The axis of symmetry is <math>x = -\frac{b}{2a}</math>.</li> </ul>
Vertex form	$y = a(x - h)^2 + k$	<ul style="list-style-type: none"> <li>The vertex is <math>(h, k)</math>.</li> <li>The axis of symmetry is <math>x = h</math>.</li> </ul>
Intercept form	$y = a(x - p)(x - q)$	<ul style="list-style-type: none"> <li>The <math>x</math>-intercepts are <math>p</math> and <math>q</math>.</li> <li>The axis of the symmetry is <math>x = \frac{p + q}{2}</math>.</li> </ul>

## Big Idea 2

TEKS 2A.8.D

## Solving Quadratic Equations Using a Variety of Methods

There are several different methods you can use to solve a quadratic equation.

Equation contains:	Example	Method
Binomial without $x$ -term	$5x^2 - 45 = 0$	Isolate the $x^2$ -term. Then take square roots of each side.
Factorable trinomial	$x^2 - 5x + 6 = 0$	Factor the trinomial. Then use the zero product property.
Unfactorable trinomial	$x^2 - 8x + 35 = 0$	Complete the square, or use the quadratic formula.

## Big Idea 3

TEKS a.2

## Performing Operations with Square Roots and Complex Numbers

You can use the following properties to simplify expressions involving square roots or complex numbers.

<b>Square roots</b>	If $a > 0$ and $b > 0$ , then $\sqrt{ab} = \sqrt{a} \cdot \sqrt{b}$ and $\sqrt{\frac{a}{b}} = \frac{\sqrt{a}}{\sqrt{b}}$ .
<b>Complex numbers</b>	<ul style="list-style-type: none"> <li>The imaginary unit <math>i</math> is defined as <math>i = \sqrt{-1}</math>, so that <math>i^2 = -1</math>.</li> <li>If <math>r</math> is a positive real number, then <math>\sqrt{-r} = i\sqrt{r}</math> and <math>(i\sqrt{r})^2 = -r</math>.</li> <li><math>(a + bi) + (c + di) = (a + c) + (b + d)i</math></li> <li><math>(a + bi) - (c + di) = (a - c) + (b - d)i</math></li> <li><math> a + bi  = \sqrt{a^2 + b^2}</math></li> </ul>