

keep scrolling to get a
sneak peak!

This set of guided notes will walk Algebra 2 students through completing the square to solve quadratic equations and write equations in vertex form. All you need to do is print & make copies for your students!

COMPLETING THE SQUARE

Algebra 2 Guided Notes

COMPLETING THE SQUARE

Completing the square - Visual Model

Find the value of c that makes $x^2 + 14x + c$ a perfect square trinomial. Express the equation as the expression of the square of binomials.

Find half of the coefficient of x .

Square the result from step 1.

Add the result from step 2 to create a perfect square trinomial.

Write the perfect square trinomial as a square of a binomial.

COMPLETING THE SQUARE

Completing the square - Algebraically

Steps for Completing the Square

Step 1: Rewrite the equation into Standard form on one side set equal to 0.

Step 2: Identify the a , b , and c terms. Move the c term to the other side of the equation.

Step 3: Complete the square by adding $(\frac{b}{2})^2$ to both sides of the equation.

Step 4: Factor the perfect square trinomial into the square of a binomial.

Step 5: Solve for x using the square roots method.

**If "a" is not 1, you need to factor out the GCF to make $a = 1$ **

Directions: Solve by completing the square.

$x^2 + 10x - 7 = 0$

$x^2 + 10x + \underline{\quad} = 7 + \underline{\quad}$

$b = 10$ $\frac{b}{2} = 5$ $(\frac{b}{2})^2 = 25$

$x^2 + 10x + 25 = 7 + 25$

$(x + 5)^2 = 32$

$x + 5 = \pm\sqrt{32}$

$x = -5 \pm \sqrt{32}$

$2x(x - 2) = 200$

$2x^2 - 4x = 200$

$x^2 - 2x = 100$

$x^2 - 2x + 1 = 100 + 1$

$(x - 1)^2 = 101$

$x - 1 = \pm\sqrt{101}$

$x = 1 \pm \sqrt{101}$

Math with Ms. Rivera

Answer key included

why do you need this?



It's simple and done-for-you! Just print and make copies!



Students can work on essential Algebra 2 skills.



Aligns to CCSS, TEKs, and VA SOLs!



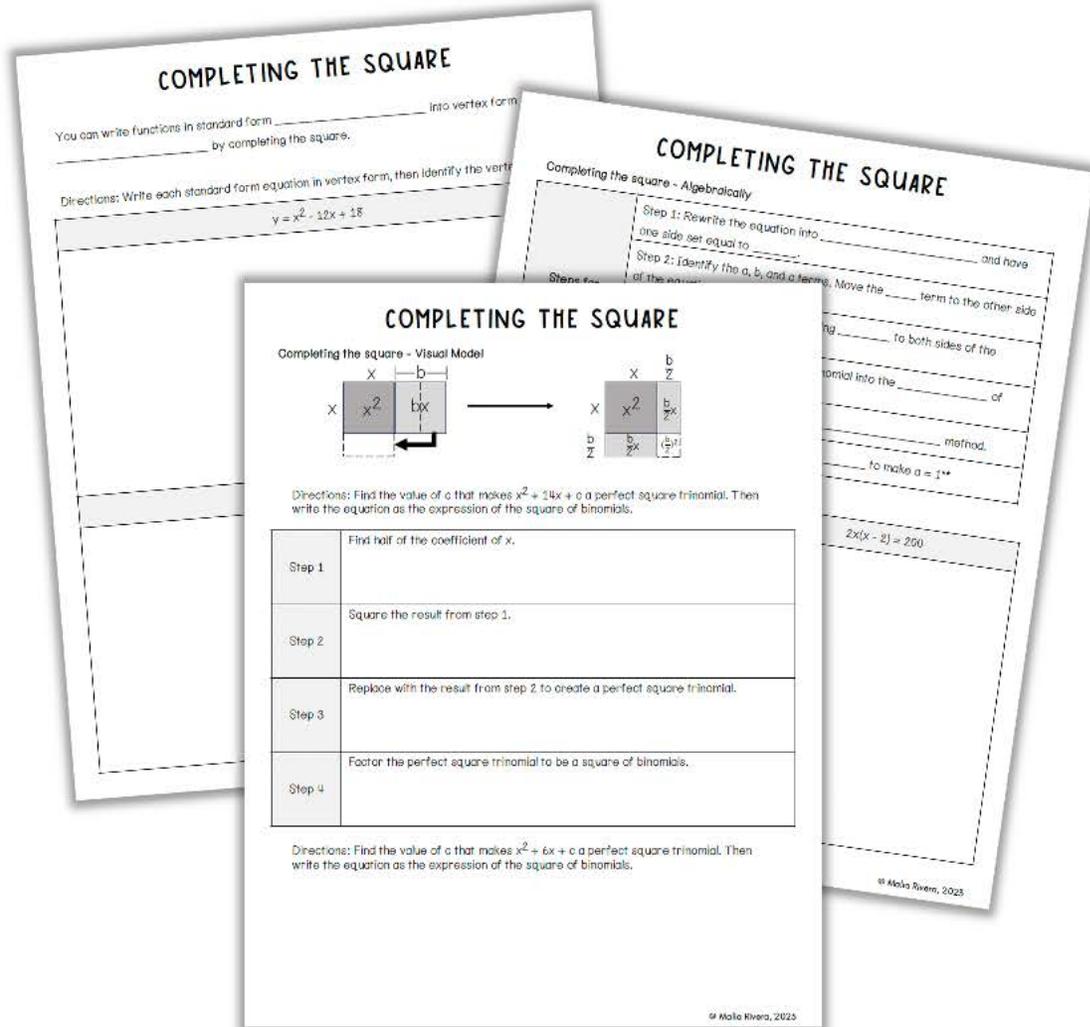
Suggested and detailed answer keys are included for you!

Algebra 2 Guided Notes Completing the Square

The image shows three overlapping worksheets titled "COMPLETING THE SQUARE".

- Top Worksheet (Visual Model):** Titled "Completing the square - Visual Model". It shows a diagram of a square with side length $x+b$. The square is divided into four regions: a top-left square of side x with area x^2 , a top-right rectangle of width b and height x with area bx , a bottom-left rectangle of width x and height b with area bx , and a bottom-right square of side b with area b^2 . An arrow points to a completed square of side $x+b$ with area $(x+b)^2$. Below the diagram, it says: "Directions: Find the value of a that makes $x^2 + 4x + a$ a perfect square. Write the equation as the expression of the square of binomials." It includes a table with steps: Step 1: Find half of the coefficient of x . Step 2: Square the result. Step 3: Replace a with the result from Step 2. Step 4: Factor the trinomial. Below the table, it says: "Directions: Find the value of a that makes $x^2 + 4x + a$ a perfect square. Write the equation as the expression of the square of binomials."
- Middle Worksheet (Algebraically):** Titled "Completing the square - Algebraically". It contains instructions: "Step 1: Rewrite the equation into standard form $ax^2 + bx + c = 0$ and have one side set equal to $-c/a$." "Step 2: Identify the a , b , and c terms. Move the a term to the other side of the equation." "Step 3: Divide both sides of the equation by a to make $a = 1$." "Step 4: Complete the square by adding $(b/2)^2$ to both sides of the equation." "Step 5: Write the equation in vertex form $y = a(x-h)^2 + k$." Below the steps, it says: "Directions: Write each standard form equation in vertex form, then identify the vertex." It includes two example problems: $y = x^2 - 12x + 18$ and $y = -3x^2 - 18x - 21$.
- Bottom Worksheet (Blank):** A blank worksheet with the title "COMPLETING THE SQUARE" and a large empty space for student work.

Algebra 2 Guided Notes: Completing the Square *includes:*



- ✓ 3 page of guided notes
- ✓ Visual Model for Completing the Square
- ✓ Steps to Complete the Square to Solve Quadratic Equations
- ✓ Writing Quadratic Equations from Standard Form to Vertex Form

Algebra 2 Guided Notes: Completing the Square *includes:*

 Detailed answer keys

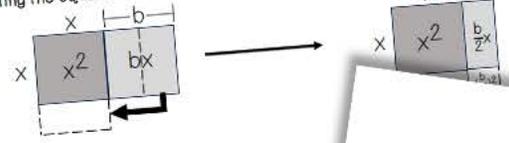
CCSS: HSA-REI.B.4, HSA-REI.B.4a

TEKS: A2.4.F

VA SOLs: EI.AII.3.b

COMPLETING THE SQUARE

Completing the square - Visual Model



Directions: Find the value of c that makes $x^2 + 14x + c$ a perfect square trinomial. Write the equation as the expression of the square.

Step 1	Find half of the coefficient of x . $\frac{14}{2} = 7$
Step 2	Square the result from step 1. $7^2 = 49$
Step 3	Replace with the result from step 2. $x^2 + 14x + 49$
Step 4	Factor the perfect square trinomial. $(x + 7)^2$

Directions: Find the value of c that makes $x^2 + 6x + c$ a perfect square trinomial. Write the equation as the expression of the square.
 $\frac{6}{2} = 3 \rightarrow 3^2 = 9$

COMPLETING THE SQUARE

Completing the square - Algebraically

Steps for Completing the Square

- Step 1: Rewrite the equation into standard form and have one side set equal to 0.
- Step 2: Identify the a , b , and c terms. Move the c term to the other side of the equation.
- Step 3: Complete the square by adding $(\frac{b}{2})^2$ to both sides of the equation.
- Step 4: Factor the perfect square trinomial into the square of binomials.
- Step 5: Solve for x using the square roots method.

**If "a" is not 1, you need to factor out the GCF to make $a = 1$ **

Directions: Solve by completing the square.

$x^2 + 10x - 7 = 0$ $x^2 + 10x + \underline{\quad} = 7 + \underline{\quad}$ $b = 10 \quad \frac{b}{2} = 5 \quad (\frac{b}{2})^2 = 25$ $x^2 + 10x + 25 = 7 + 25$ $x^2 + 10x + 25 = 32$ $\sqrt{(x+5)^2} = \sqrt{32}$ $x+5 = \pm\sqrt{32} \rightarrow \sqrt{32} = 4\sqrt{2}$ $x = -5 \pm 4\sqrt{2}$	$2x(x-2) = 200$ $2x^2 - 4x = 200$ $-200 \quad -200$ $2x^2 - 4x - 200 = 0$ $2(x^2 - 2x - 100) = 0$ $x^2 - 2x - 100 = 0$ $+100 \quad +100$ $x^2 - 2x + \underline{\quad} = 100 + \underline{\quad}$
---	--

Check out what *other teachers* are saying:



"This was great practice for my Algebra II students after I presented the lesson. Next Year, I may use them as notes."

- Vonda B.



"Great resource for what we were currently covering in precalc!"

- Megan M.



"I used this in conjunction with another document, but this would have worked fine on its own. The students found it much easier to understand the concept using these guided notes."

- Cheryl W.

You may also enjoy ...

QUADRATIC FORMULA

Algebra 2 Guided Notes

THE QUADRATIC FORMULA

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

THE QUADRATIC FORMULA

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Steps for Using the Quadratic Formula:

- Step 1: Rewrite the quadratic equation in standard form so one side equals 0.
- Step 2: Identify the values for a, b, and c and plug them into the quadratic formula.
- Step 3: Evaluate the quadratic formula to solve for x. Read the directions carefully for how you should leave your answer.

Directions: Solve each quadratic equation using the quadratic formula. Leave your answer in simplest radical or fraction form.

$x^2 + 3x = 0$	$20x^2 - 8x = 12x - 4$
$x^2 - 5x - 6 = 0$	$-12x + 4 = -20x^2 + 8x$
$x^2 + 3x - 6 = 0$	$-12x + 4 = -20x^2 + 8x$

Answer key included

© Malia Rivera, 2023

THE DISCRIMINANT

Algebra 2 Guided Notes

THE DISCRIMINANT

The discriminant is used to determine the number and types of solutions of a quadratic equation.

	$b^2 - 4ac > 0$	$b^2 - 4ac = 0$	$b^2 - 4ac < 0$
Number of Solutions	2 real solutions	1 real solution	no real solutions
Graph of $y = ax^2 + bx + c$			
Number of x-intercepts	2 x-intercepts	1 x-intercept	no x-intercepts

Directions: Solve each quadratic equation using the quadratic formula. Leave your answer in simplest radical or fraction form.

Answer key included

© Malia Rivera, 2023

PROJECTILE MOTION

Algebra 2 Guided Notes

APPLICATION: PROJECTILE MOTION

	Dropped Object	Launched Object
Graph		
Equation	$h = -\frac{1}{2}gt^2 + h_0$	$h = -\frac{1}{2}gt^2 + v_0t + h_0$
Variables	$h_0 = \text{initial height}$	$h_0 = \text{initial height}$, $v_0 = \text{initial velocity}$

1. An egg is dropped from the top of a building at a height of 50m. How long will it take for the ball to hit the ground?

2. The height of a baseball can be modeled by the function $h = -16t^2 + 96t + 3$. How long will it take for the baseball to hit the ground?

Answer key included

© Malia Rivera, 2023

Check out the *year-long bundle!*

ALGEBRA 2 GUIDED NOTES Year-Long Bundle

TRANSFORMATIONS OF FUNCTIONS

Type of Transformation	$f(x)$ Notation
Reflection	$-f(x)$
Vertical Dilation	$af(x)$ $0 < a < 1$ $ a > 1$
Horizontal Dilation	$f(bx)$ $0 < b < 1$ $ b > 1$
Vertical Translation	$f(x) + k$

LINEAR REGRESSION

SCATTER PLOT
Definition: A graph of _____ points that are _____

SCATTER PLOT RELATIONSHIPS

LINE OF BEST FIT
Definition: A line that _____ as close as possible to all _____

LINEAR REGRESSION
Definition: A linear model that is used to _____ between two variables.

LINEAR INTERSECTIONS
Estimating Slope: _____
Slope: _____
Y-intercept: _____

GRAPHING QUADRATIC TRANSFORMS

Reflection over the x-axis: _____
Reflection over the y-axis: _____

COMPOSITION OF FUNCTIONS

Definition: To make the _____ another function.

Things to remember:

- Always start with the _____ the function on the _____
- Tag does not always equal _____

$(f \circ g)(x) = \dots$ is _____

$g(x) = 2x + 3$ and $f(x) = x^2$, find $(f \circ g)(x)$

$g(x) = 2x + 3$ and $f(x) = x^2$, find $(f \circ g)(x)$

COMPOUND INEQUALITIES

Compound inequality has two separate inequalities joined by _____

Graph of a compound inequality with "and" is the _____ of the graphs of the inequalities.

$x > 3$

POLYNOMIAL FUNCTION CHARACTERISTICS

Characteristics	Graph
Intercepts	
Touch	
Inflection	

RELATIVE EXTREMA (Minimum or Maximum)
Points on the graph that help to describe the _____ of a function. They are also called _____ or _____.

INCREASING INTERVALS
The interval between _____ y-values as the x-value _____.

DECREASING INTERVALS
The interval between _____ y-values as the x-value _____.

POSITIVE INTERVALS
Intervals where _____

PROPERTIES OF RATIONAL EXPONENTS & RADICALS

Property	Properties of Rational Exponents
Product of Powers	Definition: _____
Power of a Power	_____
Power of a Product	_____
Negative Exponent	_____
Zero Exponent	_____
Quotient of Powers	_____
Power of a Quotient	_____

Directions: Use the properties of rational exponents to simplify: $1. (y^{1/2} \cdot y^{1/3})^2$

Answer key included

Math with Ms. Rivera



hey there!

My name is Malia and I'm passionate about making learning and practicing math fun. I love creating engaging math resources for my students and I hope your students enjoy these Completing the Square guided notes for Algebra 2 that can be used all year long!

Did you know you could get **FREE** money from TPT??

All you need to do is leave feedback on the product after you purchase. [Click here](#) to leave reviews and earn credits towards your next TPT purchase!

let's connect!



Follow my TPT store



Follow my Instagram



Join my FB group