

keep scrolling to get a  
sneak peak!

This set of guided  
notes will walk Algebra  
2 students through the  
writing polynomial  
equations.

All you need to do is print  
& make copies for your  
students!

# WRITING POLYNOMIAL EQUATIONS

## Algebra 2 Guided Notes

**WRITING POLYNOMIAL EQUATIONS FROM GRAPH**

Step 1: Identify the zeros and their factors

Step 2: Identify one more point on the graph

Step 3: Write out your polynomial in factored form

Step 4: Plug in the additional point to find your a-value

Step 5: Write it all out!

Write a polynomial function in factored form for the polynomial

**COMPLEX CONJUGATES**

Complex Conjugates Theorem

If  $a + bi$  is a root of the polynomial, then its complex conjugate,  $a - bi$ , is also a root.

Steps for writing polynomial questions with complex roots

Step 1: Identify the all real and complex roots

Step 2: Write the polynomial in factored form

Step 3: Multiply the factors together and simplify

Directions: Write a polynomial function  $f(x)$  of least degree that has leading coefficient of 1, and zeros: 2 and  $3 + i$ .

Math with Ms. Rivera

zeros:  $x = -6 \rightarrow (x + 6)$   
 $x = -1 \rightarrow (x + 1)$

point  $(-3, 3)$

$f(x) = (x + 6)^2(x + 1)$

Answer key included

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# 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.

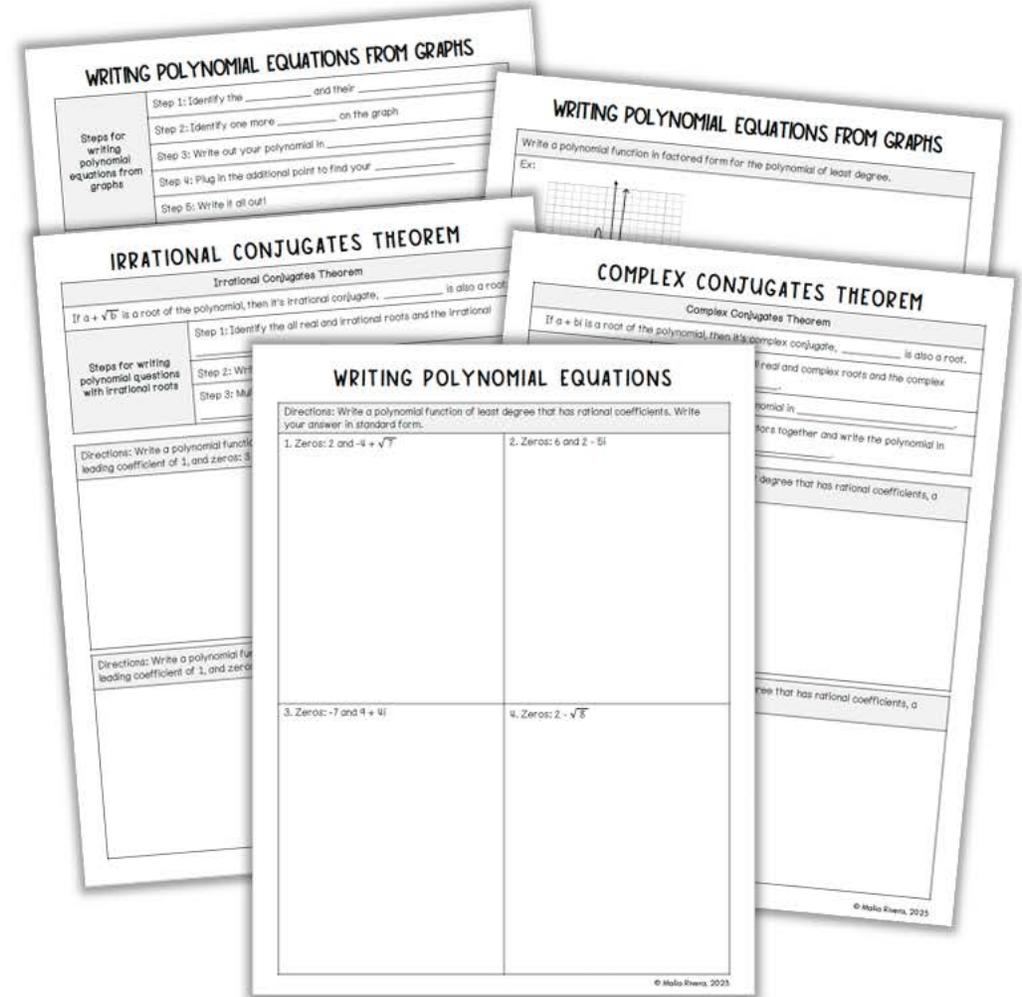


Aligns to CCSS, TEKS, and VA SOLs!

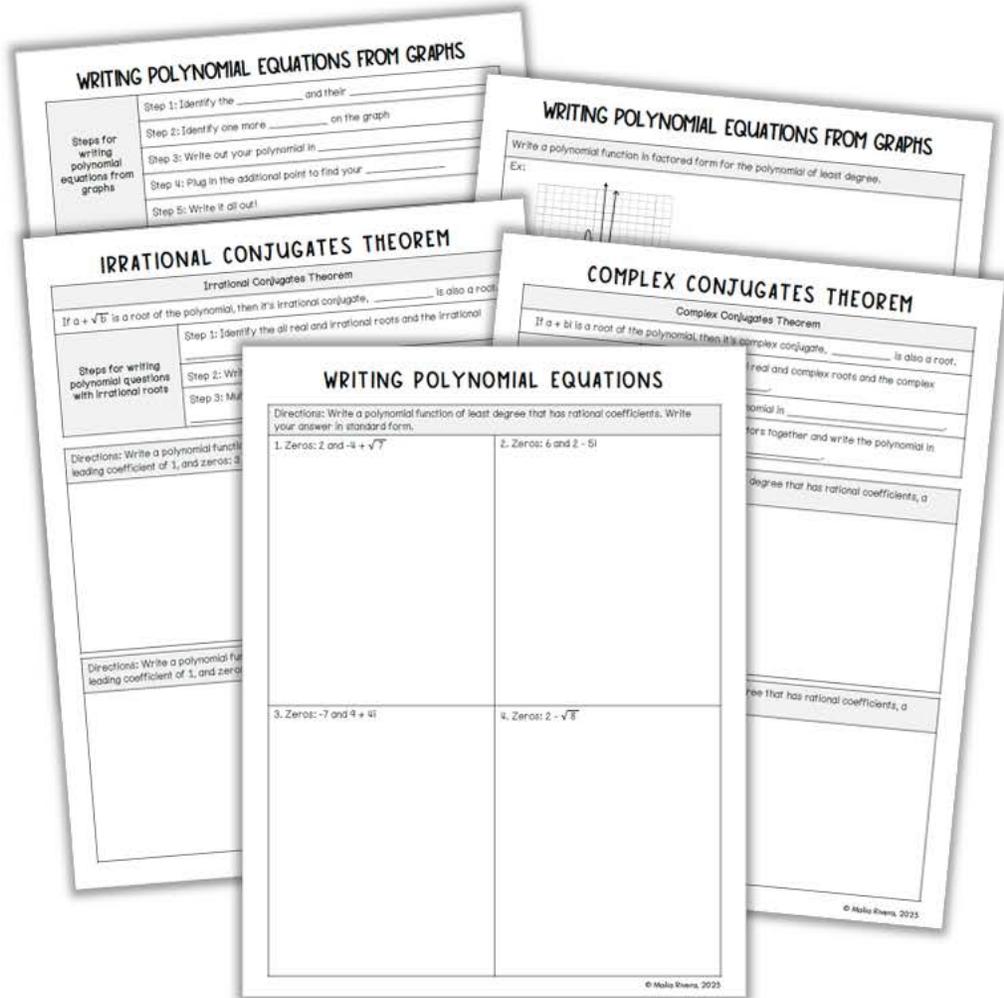


Suggested and detailed answer keys are included for you!

# Algebra 2 Guided Notes Writing Polynomial Equations



# Algebra 2 Guided Notes: Writing Polynomial Equations *includes*:



- ✓ 3 pages of guided notes
- ✓ 2 practice pages
- ✓ Writing Polynomial Equations Given a Graph
- ✓ Writing Polynomial Equations Given Zeros
- ✓ Irrational Conjugate Theorem
- ✓ Complex Conjugate Theorem

# Algebra 2 Guided Notes: Writing Polynomial Equations *includes*:

 Detailed answer keys

**CCSS:** HSA.APR.B.3, HSF.IF.C.8

**TEKS:** A2.1.B, A2.7D

**VA SOL:** F.AII.8

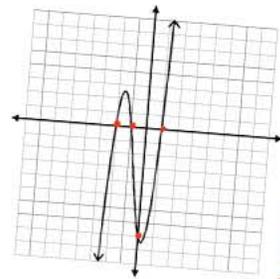
**WRITING POLYNOMIAL EQUATIONS FROM GRAPHS**

Steps for writing polynomial equations from graphs

- Step 1: Identify the zeros and their factors
- Step 2: Identify one more point
- Step 3: Write out your polynomial
- Step 4: Plug in the additional
- Step 5: Write it all out!

Directions: Write a polynomial function in factored form for the polynomial of least degree.

**Ex:**



Zeros:  $x = -2 \rightarrow (x+2)$   
 $x = -1 \rightarrow (x+1)$   
 $x = 1 \rightarrow (x-1)$   
 Point:  $(0, -8)$

$$y = a(x-1)(x+1)(x+2)$$

$$-8 = a(0-1)(0+1)(0+2)$$

$$-8 = a(-1)(1)(2)$$

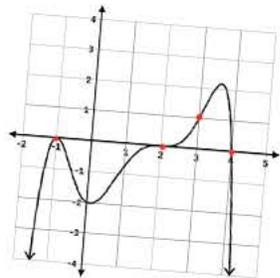
$$-8 = a(-2)$$

$$\frac{-8}{-2} = \frac{a(-2)}{-2}$$

$$a = 4$$

Equation:  $f(x) = 4(x-1)(x+1)(x+2)$

**Ex:**



Zeros:  $x = -1 \rightarrow (x+1)^2$  multiplicity 2  
 $x = 2 \rightarrow (x-2)^3$  multiplicity 3  
 $x = 4 \rightarrow (x-4)$  multiplicity 1  
 Point:  $(3, 1)$

$$y = a(x+1)^2(x-2)^3(x-4)$$

$$1 = a(3+1)^2(3-2)^3(3-4)$$

$$1 = a(4)^2(1)^3(-1)$$

$$1 = a(16)(1)(-1)$$

$$1 = a(-16)$$

$$\frac{1}{-16} = \frac{a(-16)}{-16}$$

$$-\frac{1}{16} = a$$

Equation:  $f(x) = -\frac{1}{16}(x+1)^2(x-2)^3(x-4)$

## 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 ...

# MODELING POLYNOMIAL FUNCTIONS

Algebra 2 Guided Notes

**MODELING POLYNOMIAL FUNCTIONS**

Property of Finite Differences: If a polynomial function  $y = f(x)$  has degree  $n$ , then the  $n$ th differences of the function values for equally-spaced  $x$ -values are constant.

Directions: Use finite differences to determine the degree of the data. Then use your graphing calculator to find the polynomial function.

x	1	2	3	4
y	1	4	10	20

**MODELING POLYNOMIAL FUNCTIONS**

Using Cubic Regression

Steps for Performing Cubic Regression with a Graphing Calculator

Step 1: STAT → EDIT → Enter

Step 2: Enter your data into the table

Step 3: STAT → CALC → 6: CubicReg

Step 4: Write your equation in the form:

Directions: The table below shows the total US biomass energy consumption (in British thermal units, or Btus) in the year  $t$ , where  $t = 1$  corresponds to the year 2000.

x	1	2	3	4	5	6	7	8
y	2622	2701	2807	3010	3117	3267	3493	3866

Answer key included

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# SIMPLIFYING RADICAL EXPRESSIONS

Algebra 2 Guided Notes

**SIMPLIFYING RADICAL EXPRESSIONS**

The index will tell you how many factors are needed. Ex: 6<sup>th</sup> root =  $\sqrt[6]{\quad}$

- No radicals have perfect  $n$ th powers as factors other than 1.
- No radicals contain fractions.
- No radicals are in the denominator of fractions.

radical in simplest form.

2.  $\sqrt[3]{16} = \sqrt[3]{8 \cdot 2} = \sqrt[3]{8} \cdot \sqrt[3]{2} = 2\sqrt[3]{2}$

3.  $\sqrt[3]{32} = \sqrt[3]{8 \cdot 4} = \sqrt[3]{8} \cdot \sqrt[3]{4} = 2\sqrt[3]{4}$

$\sqrt[n]{a} = a^{\frac{1}{n}}$

If  $n^2 = a$ , then  $b$  is an integer

If  $n^3 = a$ , then  $b$  is an integer

If  $n^4 = a$ , then  $b$  is an integer

If  $n^5 = a$ , then  $b$  is an integer

If  $n^6 = a$ , then  $b$  is an integer

If  $n^7 = a$ , then  $b$  is an integer

If  $n^8 = a$ , then  $b$  is an integer

If  $n^9 = a$ , then  $b$  is an integer

If  $n^{10} = a$ , then  $b$  is an integer

Answer key included

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# RATIONAL EXPONENTS

Algebra 2 Guided Notes

**RATIONAL EXPONENTS & RADICALS**

Converting between radical expressions

Directions: Write each expression in simplest form.

Rational Exponents

$\frac{3}{4}$

**PROPERTIES OF RATIONAL EXPONENTS**

Properties of Rational Exponents

Property	Property of Rational Exponents
Product of Powers	
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 each expression.

1.  $(6^{1/2} \cdot 4^{1/3})^2$

2.  $(4^5 \cdot 3^5)^{1/2}$

**RATIONAL EXPONENTS & RADICALS**

Directions: Complete the table.

Radical Form	Rational Exponent Form
$\sqrt{16}$	$16^{\frac{1}{2}}$
$(\sqrt{4})^3$	
$\sqrt[3]{64}$	$25^{\frac{1}{2}}$
$(\sqrt{9})^3$	$\frac{2}{83}$

Answer key included

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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 \_\_\_\_\_

**GRAPHING QUADRATIC TRANSFORMS**

Reflection over the x-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.

$x > -8$

**POLYNOMIAL FUNCTION CHARACTERISTICS**

Multiplicities	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**

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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 Writing Polynomial Equations guided notes for Algebra 2 that can be used all year long!

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