

keep scrolling to get a
sneak peak!

This set of guided
notes will walk Algebra
2 students through solving
polynomial equations.
All you need to do is print
& make copies for your
students!

SOLVING POLYNOMIAL EQUATIONS

Algebra 2 Guided Notes

SOLVING POLYNOMIAL EQUATIONS

Polynomial equation by factoring.

$$0 = 2x^3 - 12x^2 + 18x$$

$$12n^2 + 48n = -n^3 - 64$$



SOLVING POLYNOMIAL EQUATIONS

The Rational Root Theorem

If a polynomial function has a rational solution of $f(x) = 0$ has the form

$$\frac{p}{q} =$$

The rational root theorem helps to find all of the rational solutions, you must check the values from the list of

Ex: Find the real solutions of $x^3 - 8x^2 + 11x + 20 = 0$.

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.

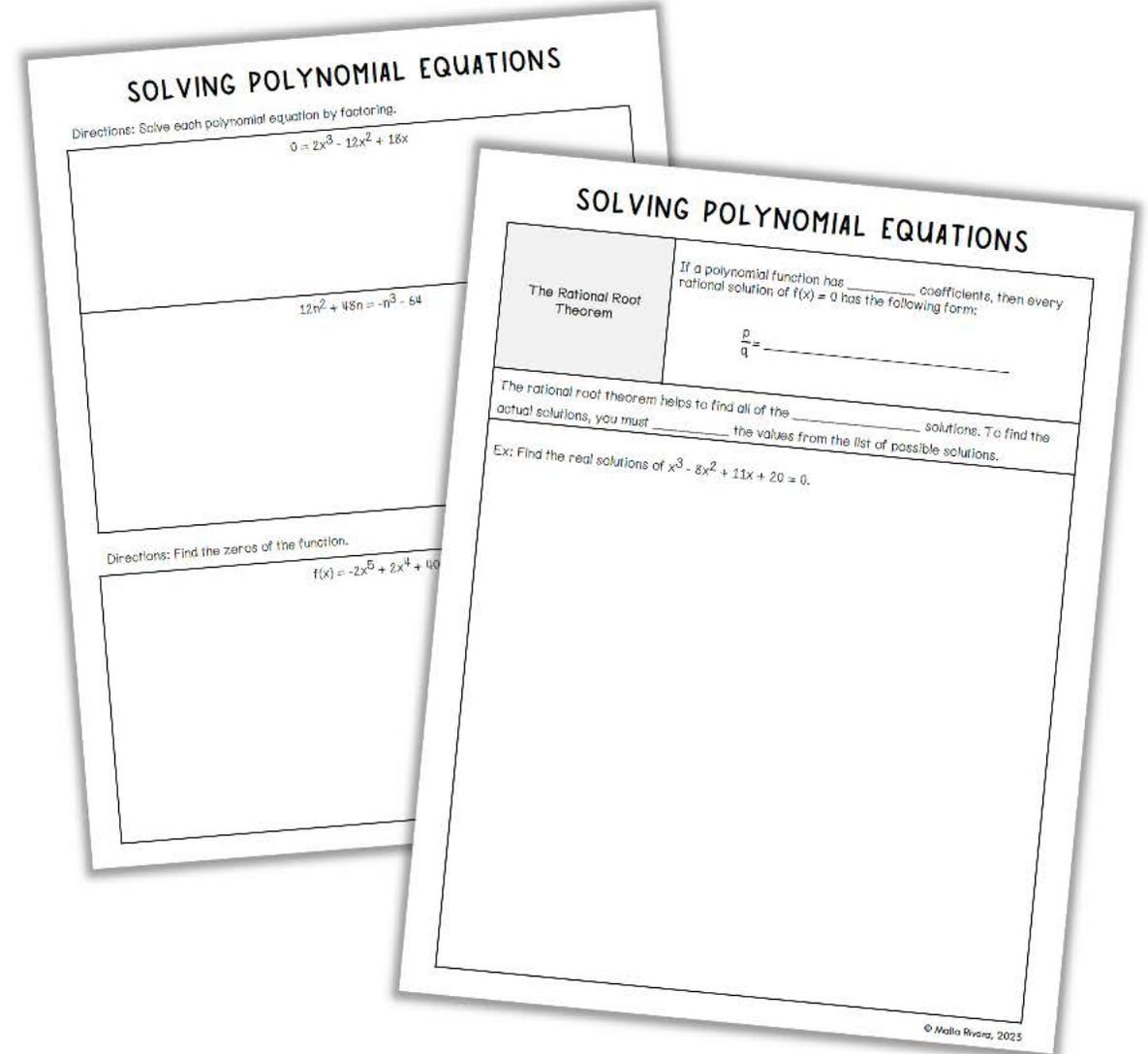


Aligns to CCSS, TEKS, and VA SOLs!

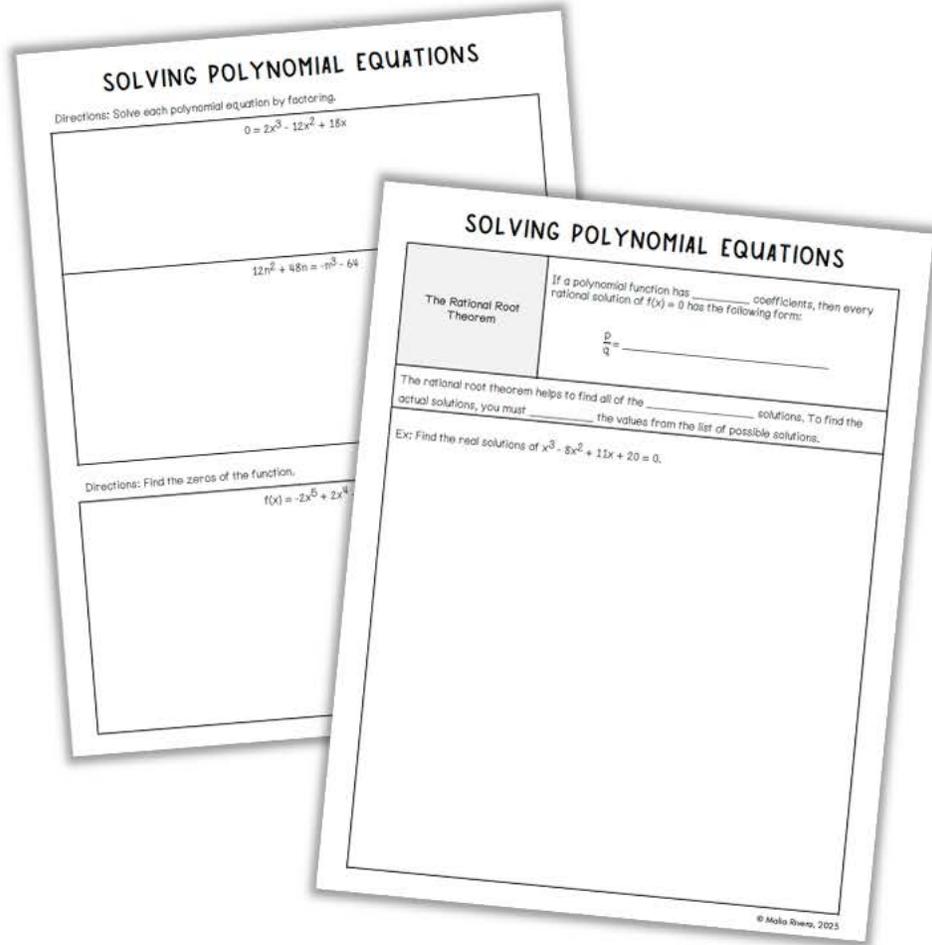


Suggested and detailed answer keys are included for you!

Algebra 2 Guided Notes Solving Polynomial Equations



Algebra 2 Guided Notes: Solving Polynomial Equations *includes*:



- ✓ 2 pages of guided notes
- ✓ Solving by Factoring
- ✓ Finding the Zeros of the Function
- ✓ The Rational Root Theorem

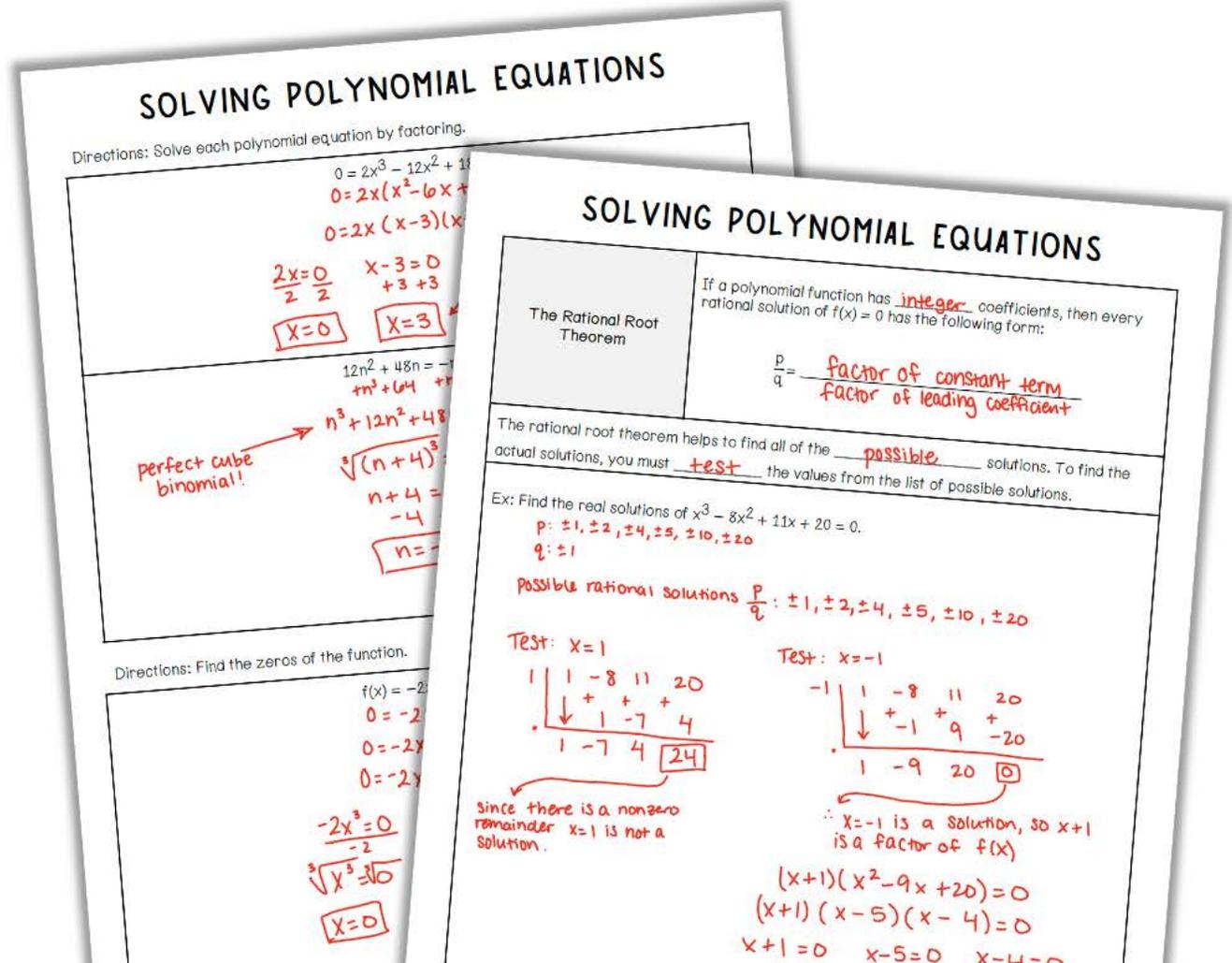
Algebra 2 Guided Notes: Solving Polynomial Equations *includes:*

 Detailed answer keys

CCSS: HSA-SSE.B.3a

TEKS: A2.7.E

VA SOL: EO.All.1c



SOLVING POLYNOMIAL EQUATIONS

Directions: Solve each polynomial equation by factoring.

$$0 = 2x^3 - 12x^2 + 18x$$
$$0 = 2x(x^2 - 6x + 9)$$
$$0 = 2x(x-3)(x-3)$$
$$\frac{2x}{2} = \frac{0}{2} \quad x-3 = 0$$
$$x = 0 \quad x = 3$$

$$12n^2 + 48n = -1$$
$$n^3 + 12n^2 + 48n = -1$$

perfect cube binomial! $\rightarrow \sqrt[3]{(n+4)^3} = -1$

$$n+4 = -1$$
$$n = -5$$

Directions: Find the zeros of the function.

$$f(x) = -2x^3 - 2x^2 + 2x$$
$$0 = -2x^3 - 2x^2 + 2x$$
$$0 = -2x(x^2 + x - 1)$$
$$-2x^3 = 0$$
$$\frac{-2x^3}{-2} = \frac{0}{-2}$$
$$\sqrt[3]{x^3} = \sqrt[3]{0}$$
$$x = 0$$

SOLVING POLYNOMIAL EQUATIONS

The Rational Root Theorem

If a polynomial function has integer coefficients, then every rational solution of $f(x) = 0$ has the following form:

$$\frac{p}{q} = \frac{\text{factor of constant term}}{\text{factor of leading coefficient}}$$

The rational root theorem helps to find all of the possible solutions. To find the actual solutions, you must test the values from the list of possible solutions.

Ex: Find the real solutions of $x^3 - 8x^2 + 11x + 20 = 0$.

$$p: \pm 1, \pm 2, \pm 4, \pm 5, \pm 10, \pm 20$$
$$q: \pm 1$$

possible rational solutions $\frac{p}{q}: \pm 1, \pm 2, \pm 4, \pm 5, \pm 10, \pm 20$

Test: $x = 1$

$$\begin{array}{r|rrrrr} 1 & 1 & -8 & 11 & 20 & \\ & & + & + & + & \\ \hline & 1 & -7 & 4 & 24 & \end{array}$$

Since there is a nonzero remainder $x=1$ is not a solution.

Test: $x = -1$

$$\begin{array}{r|rrrrr} -1 & 1 & -8 & 11 & 20 & \\ & & + & + & + & \\ \hline & 1 & -9 & 20 & 0 & \end{array}$$

$\therefore x = -1$ is a solution, so $x+1$ is a factor of $f(x)$

$$(x+1)(x^2 - 9x + 20) = 0$$
$$(x+1)(x-5)(x-4) = 0$$
$$x+1 = 0 \quad x-5 = 0 \quad x-4 = 0$$

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 ...

THE FUNDAMENTAL THEOREM OF ALGEBRA

Algebra 2 Guided Notes

THE FUNDAMENTAL THEOREM OF ALGEBRA

The Fundamental Theorem of Algebra: If $f(x)$ is a polynomial of degree n where $f(x) = 0$ has at least n solutions in the set of complex numbers.

Descartes's Rule of Signs: The number of positive real zeros of a polynomial function $f(x)$ is either equal to the number of sign changes between consecutive coefficients or less than it by an even number.

Directions: Determine the possible numbers of positive real zeros, negative real zeros, and imaginary zeros.

Example: $g(x) = x^3 + 3x^2 + 16x + 48$

Answer key included

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CHARACTERISTICS OF POLYNOMIAL FUNCTIONS

Algebra 2 Guided Notes

POLYNOMIAL FUNCTION CHARACTERISTICS

Multiplicities: Cross (graph crosses the x-axis), Touch (graph touches the x-axis and turns around).

Relative Extrema (Minimum or Maximum): Points on the graph that help to determine the shape of the function. They are also called local extrema.

Increasing Intervals: The interval between x-values where the function is increasing.

Decreasing Intervals: The interval between x-values where the function is decreasing.

Answer key included

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GRAPHING POLYNOMIAL FUNCTIONS

Algebra 2 Guided Notes

GRAPHING POLYNOMIAL FUNCTIONS

Graph of $f(x) = (x+3)(x-2)^2$ is shown in factored form. The graph crosses the x-axis at $x = -3$ and touches the x-axis at $x = 2$. The y-intercept is $(0, 12)$.

Sketch a graph of $f(x)$ that has the following characteristics: f has zeros $-2, 3,$ and 5 that do not repeat. f is increasing when $x < 0$ and $x > 4$. f is decreasing when $0 < x < 4$.

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: _____
Slope: _____
Y-intercept: _____

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 also _____

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

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

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: $1. (y^{3/2})^{-2} y^{3/2}$

Math with Ms. Rivera

ANSWER KEY INCLUDED



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 Solving Polynomial Functions guided notes for Algebra 2 that can be used all year long!

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