

keep scrolling to get a sneak peak!

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

CHARACTERISTICS OF POLYNOMIAL FUNCTIONS

Algebra 2 Guided Notes

POLYNOMIAL FUNCTION CHARACTERISTICS

Zeros	_____ is a zero of the polynomial function
Factors	_____ is a factor of the polynomial function
Solutions	_____ is a solution (or _____) of the polynomial function
X-Intercepts	If k is a real number, then k is an _____ of the polynomial function $f(x)$. The _____.

POLYNOMIAL FUNCTION CHARACTERISTICS

Multiplicities	
Cross	Touch

Relative Extrema (Minimum or Maximum)	Points on the graph that help to determine the intervals in which a function is _____ or _____. They are also called _____.
Increasing Intervals	The interval between _____ and _____ y-value _____.
Decreasing Intervals	
Positive Intervals	

Math with Ms. Rivera

$f(x) = x^3 - 7x$

$g(x) = x^4$

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 Characteristics of Polynomial Functions

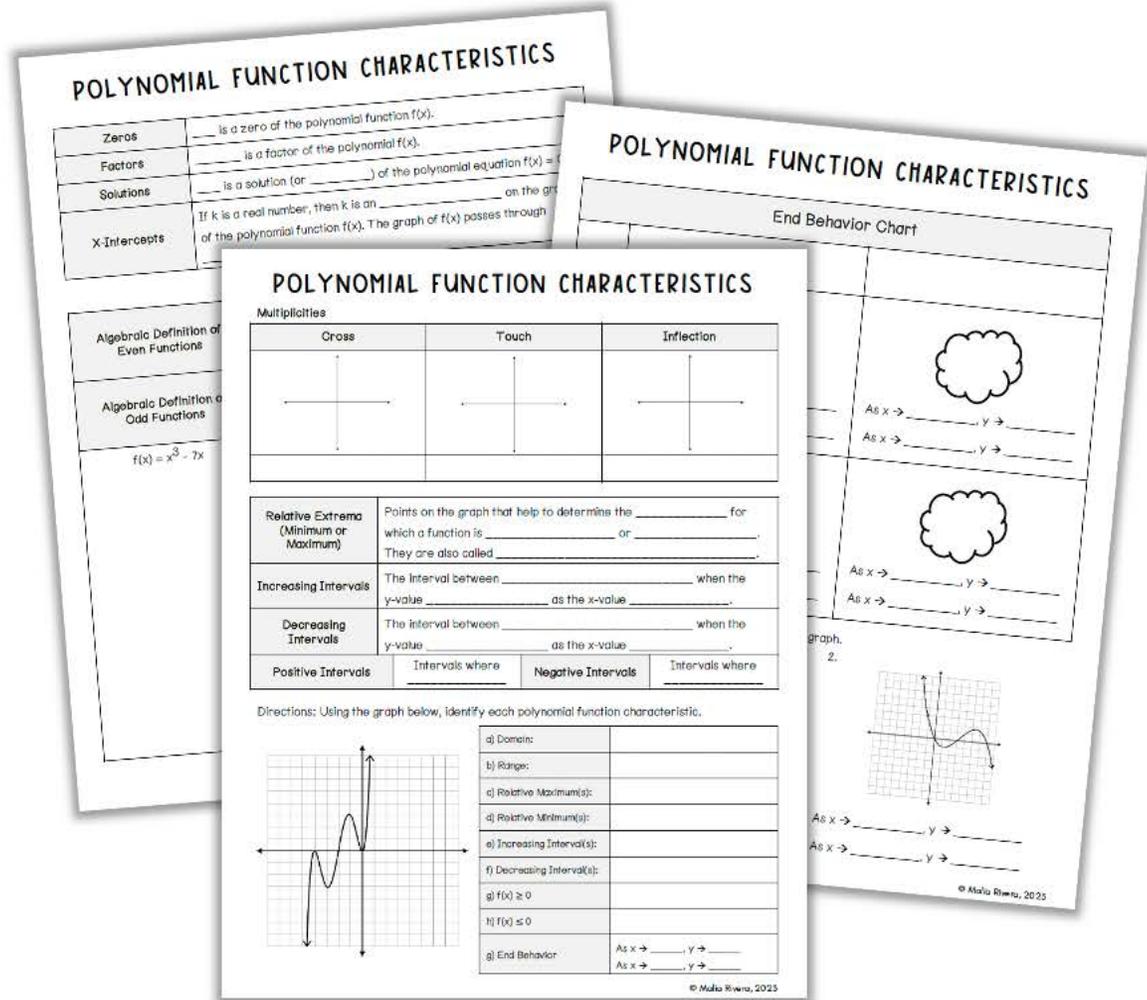
The worksheets include the following sections:

- POLYNOMIAL FUNCTION CHARACTERISTICS**
 - Zeros: _____ is a zero of the polynomial function $f(x)$.
 - Factors: _____ is a factor of the polynomial $f(x)$.
 - Solutions: _____ is a solution (or _____) of the polynomial equation $f(x) = 0$.
 - X-Intercepts: If k is a real number, then k is an _____ on the graph of the polynomial function $f(x)$. The graph of $f(x)$ passes through _____.
- POLYNOMIAL FUNCTION CHARACTERISTICS**
 - Multiplicities**

Cross	Touch	Inflection
 - Relative Extrema (Minimum or Maximum)**: Points on the graph that help to determine the _____ for which a function is _____ or _____. They are also called _____.
 - Increasing Intervals**: The interval between _____ when the y-value _____ as the x-value _____.
 - Decreasing Intervals**: The interval between _____ when the y-value _____ as the x-value _____.
 - Positive Intervals**: Intervals where _____
 - Negative Intervals**: Intervals where _____
- End Behavior Chart**
 - As $x \rightarrow \dots$, $y \rightarrow \dots$
 - As $x \rightarrow \dots$, $y \rightarrow \dots$
- Directions**: Using the graph below, identify each polynomial function characteristic.

a) Domain:	
b) Range:	
c) Relative Maximum(s):	
d) Relative Minimum(s):	
e) Increasing Interval(s):	
f) Decreasing Interval(s):	
g) $f(x) \geq 0$:	
h) $f(x) \leq 0$:	
g) End Behavior:	As $x \rightarrow \dots$, $y \rightarrow \dots$ As $x \rightarrow \dots$, $y \rightarrow \dots$

Algebra 2 Guided Notes: Characteristics of Polynomial Functions *includes:*



- ✓ 3 pages of guided notes
- ✓ Even, Odd, or Neither Polynomial Functions
- ✓ End Behavior
- ✓ Multiplicities
- ✓ Relative Extrema
- ✓ Increasing and Decreasing Intervals
- ✓ Positive and Negative Intervals

Algebra 2 Guided Notes: Characteristics of Polynomial Functions *includes:*

 Detailed answer keys

CCSS: HSA-APR.B.3, HSF-IF.C.7c

TEKS: P.2.I, P.2.J

VA SOL: F.All.7bcdeh

POLYNOMIAL FUNCTION CHARACTERISTICS

Zeros	k is a zero of the polynomial function $f(x)$.
Factors	$x-k$ is a factor of the polynomial $f(x)$.
Solutions	k is a solution (or <u>root</u>) of the poly
X-Intercepts	If k is a real number, then k is an <u>X-inter</u> of the polynomial function $f(x)$. The graph of $f(x)$ passes through the point $(k, 0)$.

Algebraic Definition of Even Functions	$f(-x) = f(x)$
Algebraic Definition of Odd Functions	$f(-x) = -f(x)$
$f(x) = x^3 - 7x$ $f(-x) = (-x)^3 - 7(-x)$ $f(-x) = -x^3 + 7x$ $-f(x) = -(x^3 - 7x)$ $-f(x) = -x^3 + 7x$ since $f(-x) = -f(x)$, $f(x)$ is an odd function.	$g(x) = x^4 + x^2 - 1$ $g(-x) = (-x)^4 + (-x)^2 - 1$ $g(-x) = x^4 + x^2 - 1$ $-g(x) = -(x^4 + x^2 - 1)$ $-g(x) = -x^4 - x^2 + 1$ since $g(-x) = g(x)$, $g(x)$ is an even function.

POLYNOMIAL FUNCTION CHARACTERISTICS

		End Behavior Chart	
		Positive Leading Coefficient	Negative Leading Coefficient
Odd Degree	As $x \rightarrow \infty$, $y \rightarrow \infty$ As $x \rightarrow -\infty$, $y \rightarrow -\infty$		
	As $x \rightarrow \infty$, $y \rightarrow -\infty$ As $x \rightarrow -\infty$, $y \rightarrow \infty$		

Directions: Determine the end behavior of each graph.

- 
- 

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 ...

GRAPHING POLYNOMIAL FUNCTIONS

Algebra 2 Guided Notes

Graph of $f(x) = (x+3)(x-2)^2$ is written in **factored form**

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 $0 < x < 4$

$f(x) > 0$ when
 $f(x) < 0$ when:

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Answer key included

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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!

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

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 $3+i$.

zeros: $x = -6 \rightarrow (x+6)$
 $x = -1 \rightarrow (x+1)$
 point $(-3, 3)$

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Answer key included

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MODELING POLYNOMIAL FUNCTIONS

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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

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	2522	2701	2807	3010	3117	3267	3443	3666

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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 data: _____
Clear: _____
Write: _____

GRAPHING QUADRATIC TRANSFORMS

Reflection over the x-axis: _____
Reflection: _____

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" of the graphs of the inequalities.

The graph of the _____ is the _____

$x > -8$

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 _____ x -values _____ as the x -value _____.

DECREASING INTERVALS
The interval between _____ x -values _____ intervals where _____.

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

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