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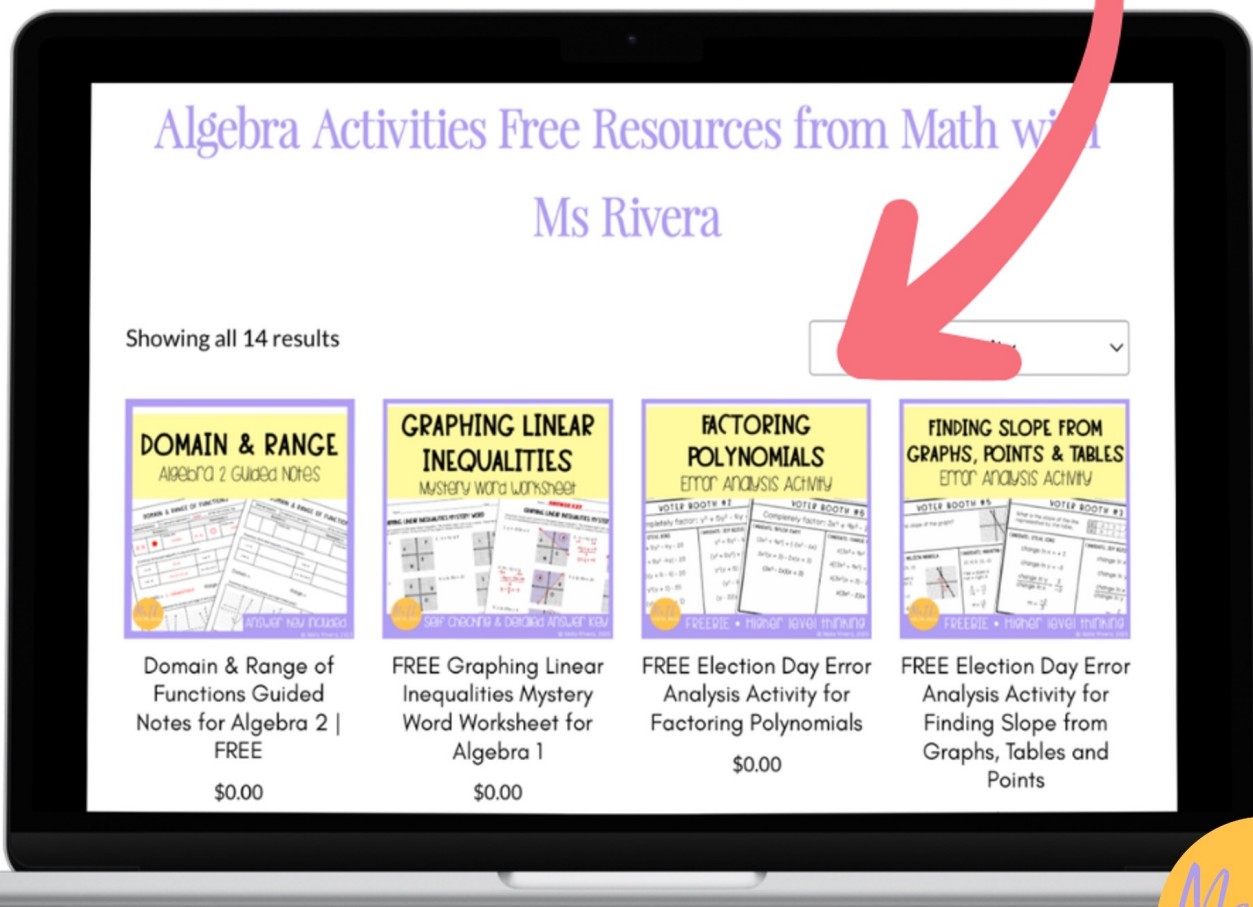
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# CLASSIFYING POLYNOMIALS

|                     |                                                           |
|---------------------|-----------------------------------------------------------|
| Polynomial          | A monomial or the _____ of monomials                      |
| Polynomial Function | A polynomial written in the form: _____                   |
| Degree              | The _____ power of a variable in the polynomial function. |
| Leading Coefficient | The _____ of the term with the highest degree.            |

| Degree | Type of Polynomial | Standard Form |
|--------|--------------------|---------------|
|        |                    |               |
|        |                    |               |
|        |                    |               |
|        |                    |               |
|        |                    |               |

Directions: Decide whether each function is a polynomial function or not. If so, write it in standard form and state the degree, type, and leading coefficient.

1.  $f(x) = -2x^3 + 5x + 8$

2.  $m(x) = x^2 + 7x^{-1} + 10$

3.  $g(x) = -0.8x^3 + \sqrt{2}x^4 - 12$

4.  $d(x) = x^2 + 4^x$

# ANSWER KEY CLASSIFYING POLYNOMIALS

|                     |                                                                                                           |
|---------------------|-----------------------------------------------------------------------------------------------------------|
| Polynomial          | A monomial or the <u>sum</u> of monomials                                                                 |
| Polynomial Function | A polynomial written in the form: <u><math>y = a_n x^n + a_{n-1} x^{n-1} + \dots + a_1 x + a_0</math></u> |
| Degree              | The <u>highest</u> power of a variable in the polynomial function.                                        |
| Leading Coefficient | The <u>coefficient</u> of the term with the highest degree.                                               |

| Degree | Type of Polynomial | Standard Form                                               |
|--------|--------------------|-------------------------------------------------------------|
| 0      | constant           | $y = a_n$                                                   |
| 1      | Linear             | $y = a_n x$                                                 |
| 2      | Quadratic          | $y = a_n x^2 + a_{n-1} x + a_0$                             |
| 3      | Cubic              | $y = a_n x^3 + a_{n-1} x^2 + a_{n-2} x + a_0$               |
| 4      | Quartic            | $y = a_n x^4 + a_{n-1} x^3 + a_{n-2} x^2 + a_{n-3} x + a_0$ |

Directions: Decide whether each function is a polynomial function or not. If so, write it in standard form and state the degree, type, and leading coefficient.

1.  $f(x) = -2x^3 + 5x + 8$

yes,  $f(x)$  is a polynomial written in standard form.  
degree: cubic LC: -2

2.  $m(x) = x^2 + 7x^{-1} + 10$

$m(x)$  is not a polynomial because you cannot have a negative exponent.

3.  $g(x) = -0.8x^3 + \sqrt{2}x^4 - 12$

$g(x)$  is a polynomial.  $g(x) = \sqrt{2}x^4 - 0.8x^3 - 12$  degree: Quartic  
LC:  $\sqrt{2}$

4.  $d(x) = x^2 + 4^x$

$d(x)$  is not a polynomial because the exponent cannot be an exponent.

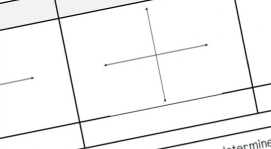
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## POLYNOMIAL FUNCTIONS

### Algebra 2 Guided Notes

#### POLYNOMIAL FUNCTION CHARACTERISTICS

| Touch                                                                               |
|-------------------------------------------------------------------------------------|
|  |

Points on the graph that help to determine which a function is \_\_\_\_\_  
They are also called \_\_\_\_\_

The interval between \_\_\_\_\_ as the x-value \_\_\_\_\_

The interval between \_\_\_\_\_ as the y-value \_\_\_\_\_

The interval between \_\_\_\_\_ as the \_\_\_\_\_ value \_\_\_\_\_

Intervals where \_\_\_\_\_

Identify each polynomial

a) Domain: \_\_\_\_\_  
b) Range: \_\_\_\_\_  
c) Relative Maximum: \_\_\_\_\_

#### COMPLEX CONJUGATES

Complex Conjugates

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 roots

Step 2: Write the polynomial

Step 3: Multiply the factors

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

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

#### CLASSIFYING POLYNOMIALS

| Polynomial          | A monomial or the _____                |
|---------------------|----------------------------------------|
| Polynomial Function | A polynomial written in the form _____ |
| Degree              | The _____ power of the _____           |
| Leading Coefficient | The _____ of the _____                 |

| Degree | Type of Polynomial |
|--------|--------------------|
| _____  | _____              |
| _____  | _____              |
| _____  | _____              |
| _____  | _____              |
| _____  | _____              |

Directions: Decide whether each function is a polynomial. If it is, write it in standard form and state the degree.

1.  $f(x) = -2x^3$

Answer key included

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# CREDITS

THANK YOU TO ALL THE AMAZING  
ARTISTS FOR THEIR BEAUTIFUL DESIGN  
ELEMENTS IN THIS RESOURCE!

