1.1 Classifying Polynomials and Distribution

This year will be focused a lot on polynomials. In order to fully define a polynomial, there are some other terms that we will need to know as well.

|  |  |
| --- | --- |
| Word | Definition |
| Coefficient |  |
| Constant |  |
| Term |  |
| Polynomial |  |
| Degree |  |

Polynomials come in many forms. In order to classify a polynomial, we look at two things: the

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and the \_\_\_\_\_\_\_\_\_\_\_\_\_.

|  |  |
| --- | --- |
| One term: | Degree 1: |
| Two terms: | Degree 2: |
| Three terms: | Degree 3: |
| Four terms: | Degree 4: |

1. Identify the information for each polynomial. Then classify the polynomial.

|  |  |
| --- | --- |
|  |  |
| Coefficients: | Coefficients: |
| Constants: | Constants: |
| Number of terms: | Number of terms: |
| Degree: | Degree: |
| Classification: | Classification: |

|  |  |
| --- | --- |
|  |  |
| Coefficients: | Coefficients: |
| Constants: | Constants: |
| Number of terms: | Number of terms: |
| Degree: | Degree: |
| Classification: | Classification: |

Something that you will be asked to do a lot is to **simplify** an expression. Simplifying basically means that we are going to make the expression look nicer.

A step to simplifying is to combine **like terms**, meaning \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

1. Simplify each expression.

|  |  |
| --- | --- |
|  |  |
|  |  |

Another tool to help us simplify is called **the distributive property**. To distribute a term is to multiply it by each term inside the parentheses.

1. Simplify each expression.

|  |  |
| --- | --- |
|  |  |
|  |  |
|  |  |

1.2 Polynomial Operations

**Adding and subtracting polynomials**

Anytime we need to add or subtract a polynomial, the big idea is to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

1. Simplify each expression.

|  |  |
| --- | --- |
|  |  |
|  |  |
|  |  |

**Multiplying polynomials**

Multiplying polynomials is another use of the distributive property. This time we will make sure that we distribute each term in the first polynomial to each term in the second polynomial.

1. Simplify each expression.

|  |  |
| --- | --- |
|  |  |
|  |  |
|  |  |
|  |  |

1.3 Function Notation

You have been hearing about functions for a good chunk of your math career, but do you actually know what a function is?

|  |  |  |
| --- | --- | --- |
| Mathematical Definition | Translation | What it looks like |
| A function is a relationship where each input has exactly one output. |  |  |

Here is what this looks like in terms of equations:

|  |  |
| --- | --- |
| Equation | Function |
|  |  |
|  |  |
| For , find y when |  |
| For , find y when |  |

How do and relate to each other?

1. For , evaluate the function for the following:

|  |  |  |
| --- | --- | --- |
|  |  |  |

1. For , evaluate the function for the following:

|  |  |  |
| --- | --- | --- |
|  |  |  |

1. Graph the following functions.

|  |  |  |
| --- | --- | --- |
|  |  |  |

Last time we talked about polynomial operations. We are going to build on that today with function operations.

|  |  |  |
| --- | --- | --- |
| Notation | What it means | What do you do? |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

1. Given the functions below, evaluate each expression.

|  |  |  |
| --- | --- | --- |
|  |  |  |

|  |  |
| --- | --- |
| a) | b) |
| c) | d) |
| d) | e) |
| f) | g) |
| h) | i) |

1.4 Properties of Exponents

An **exponent** a number that tells us how many times a quantity is multiplied by itself. Another word for exponent is **power**. The quantity that is being multiplied by itself is called the **base**.

Ex:

Using this information, see if you can figure out some shortcuts or rules for simplifying exponents. Be sure to show your work to help you.

Product of Powers

Simplify the following exponents:

Quotient of Powers

Simplify the following exponents:

Power of Powers

Simplify the following exponents:

=

|  |  |  |  |
| --- | --- | --- | --- |
| Property | Notation | Rule | Examples |
| Product of Powers |  |  |  |
| Quotient of Powers |  |  |  |
| Power of Powers |  |  |  |

Notice that to simplify the exponents, the two expressions **must** have the same base. If you have coefficients in front of your exponent-base pair, multiply them as normal.

There are two other exponent properties that we need to talk about:

|  |  |  |
| --- | --- | --- |
| Property | Rule | Example |
| Zero Property |  |  |
| Negative  Exponent Property |  |  |

Now we’re going to put everything together. **Make sure to remember the order of operations!**

1. Simplify. Your answer should only contain positive exponents.

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  |  |  |
|  |  |  |

Sometimes we see an exponent in the form of a fraction. This means that we can rewrite it into a **radical expression**. The denominator of the fraction signifies what kind of root you are taking. The numerator signifies the exponent of the base inside the root.

Ex:

1. Convert each fractional exponent to a radical expression or vice versa.

|  |  |  |
| --- | --- | --- |
| a. | b. | c. |
| d. | e. | f. |

Now that you know what a fractional exponent means, we’re going to practice simplifying with fractional exponents.

1. Simplify. Your answer should contain only positive exponents.

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  |  |  |