

Warm-Up

10/13/17

Solve the following equations:

$$1. \quad 5x + 2 = x + 6$$

~~$-x - 2 -x - 2$~~

$$5x - x = 6 - 2$$

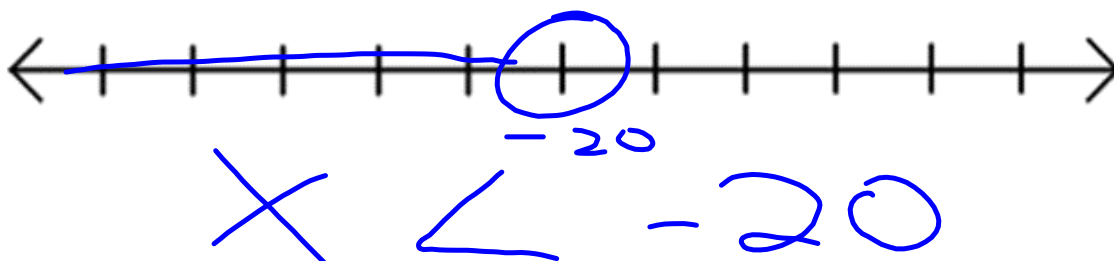
$$\frac{4x}{4} = \frac{4}{4}$$

$$x = 1$$

$$2. \quad \frac{3}{5} + x = 2\frac{1}{4}$$

3. Solve and graph the inequality.

~~$$-5 + \frac{x}{5} > 4 \cdot 5$$~~



$$2. \quad \frac{3}{5} + x = \frac{9}{4}$$

$$x = \frac{5 \cdot 9}{5 \cdot 4} - \frac{3 \cdot 4}{5 \cdot 4}$$

$$x = \frac{45}{20} - \frac{12}{20}$$

$$x = \frac{33}{20} = \boxed{\frac{13}{20}}$$

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4. Solve for m in the literal equation.

$$\cancel{d} \cdot \boxed{mg} = c \cdot d$$

$$\frac{\cancel{mg}}{\cancel{g}} = \frac{cd}{g}$$

$$\boxed{m = \frac{cd}{g}}$$

Opening

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Write an algebraic expression for the following:

1. 45 decreased by a number r

$$45 - r$$

2. Half the sum of 6 and a number m

$$\frac{6 + m}{2} \quad \frac{1}{2}(6 + m)$$

3. Add 4 to n then multiply by 5.

$$(4 + n)5$$

4. Multiply n by n then multiply by 3.

$$n \cdot n \cdot 3 = 3n^2$$

5. Multiply n by 3 then square the result.


$$(3n)^2$$

Opening

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Simplify the following:

$$6. (-7) + (8) + (-13) + (6) =$$



$$7. 2(x - 4 + 3x - 9) =$$
$$2(4x - 13)$$

$$8x - 26$$

Vocabulary Review

| Expression | $4x^2 + 3x + 7$ | | |
|--------------|-----------------|-----------|------------------|
| Terms | $4x^2$ | $3x$ | 7 _x |
| Factors | 4 and x | 3 and x | 7 |
| Coefficients | 4 | 3 | - |
| Exponents | 2 | 1 | - |
| Constants | - | - | 7 |

Essential Questions 10/13/17

1. What are Polynomials?
2. How can I classify Polynomials?

Objective

I can classify Polynomials.

Algebra 1

Unit 1: Relationships between Quantities and Expressions.

Standards:

MGSE9-12.A.APR.1:

Add, subtract, and multiply polynomials; understand that polynomials form a system analogous (similar) to the integers in that they are closed under these operations

What is a Polynomial?

My Definition

An expression that can have constants, variables, and exponents,

but:

- No division by a variable
- Only whole # exponents
- It can't have an infinite # of terms.

Characteristics

Polynomials are named by their degree and number of terms.

Vocabulary word:

Polynomial

Example

$$5xy^2 - 3x + 5y^3 - 3$$

(Cubic Polynomial with 4 terms)

$$5y^3 + 5xy^2 - 3x - 3$$

Non-Example

$$\frac{2}{x}$$

$$5x^{\frac{1}{2}} \quad 5x^{\frac{1}{2}}$$

$$x + y^{-2}$$

Which Choices are not Polynomials?

A) $\frac{1}{80}z^3$ ✓

B) $\frac{n^2}{17m}$ ✗

C) $a^8 - \frac{1}{5}a + \frac{b}{574a}$ ✗

D) $2x + 6z - 3y$ ✓

E) $\frac{5}{d} + d^3$ ✗

F) $4st^3 + 1.2t^2 - 0.8st$ ✓

$3x^{\frac{2}{3}} + 4x^2 - 5$ ✗

Interactive Note Book 10/13/17

Standard Form of Polynomials

$$5x^3 + 8x^2 + 3x - 17$$

lead coefficient

degree

The diagram shows the polynomial $5x^3 + 8x^2 + 3x - 17$. The coefficient '5' is highlighted in orange, and the exponent '3' is also in orange. A black arrow points from the text 'lead coefficient' below to the '5'. The word 'degree' is written in red to the right of the polynomial. A black curved arrow starts above the '3' and points to the word 'degree'.

Polynomial in standard form is written with degrees of each term decreasing from left to right.

$$3x^4 - 2x^3 + 4x^2 + 2x - 1$$

Degree: 4

Lead coefficient: 3

 Day 1 – Interpreting Parts of an Expression **Notes**

An expression is a mathematical phrase that can contain numbers, variables, and/or operations, but NOT an equal sign.

The terms are the things being added or subtracted.

Circle the terms in the following expressions:

- 1) $3x^2 + 2x - 1$ 3 terms
 2) $4x - 8$ 2 terms
 3) $-9a$ 1 term

The factors are the things getting multiplied in each term.

4) In question 1, what are the factors of the first term? 3 and x

5) In question 1, what are the factors of the second term? 2 and x

A Coefficient is a number directly in front of a variable (a coefficient multiplies the variable).

6) In question 2, what is the coefficient of the first term? 4

7) In question 3, what is the coefficient of the first term? -9

A Constant is a number that stands alone, WITHOUT a variable.

8) In question 1, what is the constant? -1

9) In question 2, what is the constant? -8

10) In question 3, what is the constant? None

Practice

Given the expression $5x^3 + 6x^2 - 2x + 3$, answer the following questions.

- 1) How many terms are there? 4
- 2) List the terms. $5x^3, 6x^2, -2x, 3$
- 3) How many coefficients are there? 3
- 4) List the coefficients. $5, 6, -2$
- 5) What is the coefficient of the second term? 6
- 6) What are the factors of the first term? 5 and x
- 7) What are the factors of the third term? -2 and x
- 8) What are the factors of the second term? 6 and x
- 9) What is the coefficient of the third term? -2
- 10) What is the constant and how do you know?
3 because its alone

Classifying Polynomials

Polynomials are named according to their degree and number of terms.

For a polynomial with one variable, the degree is the largest exponent of that variable.

Terms are always separated by addition or subtraction.

| Degree | Name | Example |
|--------|-----------------------|-----------------|
| 0 | Constant | $3x^0$ |
| 1 | Linear | $2x^1 + 1$ |
| 2 | Quadratic | $x^2 - 4x$ |
| 3 | Cubic | $y^3 + y^2 - 4$ |
| 4 | Quartic | $y^4 - 3$ |
| 5 | Quintic | $y^5 + y^2$ |
| 6+ | 6th degree, etc... | $z^7 + z^6$ |

| Terms | Name | Example |
|-------|------------|----------------------|
| 1 | monomial | $3x$ |
| 2 | binomial | $2y - 4$ |
| 3 | trinomial | $x^2 + 3x + 9$ |
| 4+ | polynomial | $y^3 - y^2 + 2y - 5$ |

Let's Practice! Name the following polynomials:

$-7 + 3n^3$ $3n^3 - 7$ Cubic binomial

5 constant monomial

$-x^4 + 3x^2 - 11$ Quartic trinomial

Example: Write the following polynomials in standard form, then classify by degree & terms.

Example:

$3x^2 - 7 + 4x^3 + x^6$ in standard form is $x^6 + 4x^3 + 3x^2 - 7$

1. $5x - 2 - x^3 + 6x^2$ $-x^3 + 6x^2 + 5x - 2$

2. $-3 + x^4 - 7x + 8x^3$ $x^4 + 8x^3 - 7x - 3$



Name the Polynomials by
degree and term



Classifying Polynomials

| Expression | Is it a polynomial | Name the degree | Classify it by the number of terms | leading coefficient |
|------------------------------------|--------------------|-----------------|------------------------------------|---------------------|
| $2x^2 + 3x^5 - 3$ | Yes | Quintic | Trinomial | 3 |
| -3 | Yes | Constant | Monomial | none |
| $-x^3 + x$ | Yes | Cubic | Binomial | -1 |
| $-4x^4 + 3x^{-2} - 4$ | Yes | Quartic | Trinomial | -4 |
| $\frac{2}{3}x^7 - 2x^6 + 3x^4 + x$ | Yes | 7th degree | Polynomial | 2/3 |