

NAME: \_\_\_\_\_ PERIOD: \_\_\_\_\_

# Algebra II

## UNIT 2

# Operations With Polynomials

# Advanced Algebra - Unit 2: Operations with Polynomials

## WHAT ARE YOU LEARNING?

### Henry County Graduate Learner Outcomes:

- As a Henry County graduate, I will be able to create, interpret, use, and analyze patterns of algebraic structures to make sense of problems.
- As a Henry County graduate, I will be able to use functions to interpret and analyze a variety of contexts.

### Georgia Standards of Excellence:

#### **Lesson 2-1 – Basic Polynomial Operations**

**MGSE9-12.A.APR.1** Add, subtract, and multiply polynomials; understand that polynomials form a system analogous to the integers in that they are closed under these operations.

#### **Lesson 2-2 – Binomial Theorem / Pascal’s Triangle**

**MGSE9-12.A.APR.5** Know and apply that the Binomial Theorem gives the expansion of  $(x + y)^n$  in powers of  $x$  and  $y$  for a positive integer  $n$ , where  $x$  and  $y$  are any numbers, with coefficients determined for example by Pascal’s Triangle.

#### **Lesson 2-3 – Synthetic and Long Division**

**MGSE9-12.A.APR.6** Rewrite simple rational expressions in different forms using inspection, long division, or a computer algebra system; write  $a(x)/b(x)$  in the form  $q(x) + r(x)/b(x)$ , where  $a(x)$ ,  $b(x)$ ,  $q(x)$ , and  $r(x)$  are polynomials with the degree of  $r(x)$  less than the degree of  $b(x)$ .

#### **Lesson 2-4 – Composition of Functions**

**MGSE9-12.F.BF.1** Write a function that describes a relationship between two quantities.

**MGSE9-12.F.BF.1b** Combine standard function types using arithmetic operations in contextual situations (Adding, subtracting, and multiplying functions of different types).

**MGSE9-12.F.BF.1c** Compose functions. *For example, if  $T(y)$  is the temperature in the atmosphere as a function of height, and  $h(t)$  is the height of a weather balloon as a function of time, then  $T(h(t))$  is the temperature at the location of the weather balloon as a function of time.*

#### **Lesson 2-5 – Inverses of Functions**

**MGSE9-12.F.BF.4** Find inverse functions.

**MGSE9-12.F.BF.4a** Solve an equation of the form  $f(x) = c$  for a simple function  $f$  that has an inverse and write an expression for the inverse. For example,  $f(x) = 2(x^3)$  or  $f(x) = (x+1)/(x-1)$  for  $x \neq 1$ .

**MGSE9-12.F.BF.4b** Verify by composition that one function is the inverse of another.

**MGSE9-12.F.BF.4c** Read values of an inverse function from a graph or a table, given that the function has an inverse.

# Advanced Algebra - Unit 2: Operations with Polynomials

## WHY ARE YOU LEARNING THIS?

### Level 3 Performance Task:

#### Polynomial Puzzle

Towards the end of this unit you will be given a puzzle with various polynomial operations. You will use the skills you learn in this unit to solve the puzzle.

## WHAT IS YOUR GOAL FOR THIS UNIT?

Unit Goal:

I scored a \_\_\_\_\_ on my pretest.

My goal is to score a \_\_\_\_\_ or higher on the end of unit test.

To achieve this goal I will \_\_\_\_\_

\_\_\_\_\_

## HOW WILL YOU KNOW WHEN YOU'VE MASTERED THIS? SHOW ME THE EVIDENCE!

Data Analysis:      Pre-Test Score \_\_\_\_\_      Post-Test Score \_\_\_\_\_

Learning Targets:	Pre-Test Score	Quiz Score	Post-Test Score
Prerequisite Skills			
K1: I can add, subtract, and multiply polynomials. (A.APR.1)			
R1: I can apply the binomial theorem to expand a binomial. (A.APR.5)			
R2: I can rewrite simple rational expressions in different forms including the use of synthetic and long division. (A.APR.6)			
K2: I can combine standard functions by addition, subtraction, and multiplication. (F.BF.1b)			
R4: I can compose functions. (F.BF.1c)			
R5: I can find inverse functions. (F.BF.4 and F.BF.4a)			
R6: I can use composite functions to verify inverse function relationships. (F.BF.4b)			
K3: I can read values of an inverse function from a graph or table. (F.BF.4c)			

# Advanced Algebra - Unit 2: Operations with Polynomials

## LEARNING ACTIVITIES

### Lesson 2-1 – Basic Polynomial Operations

K1: I can add, subtract, and multiply polynomials. (A.APR.1)

- Complete guided notes with teacher    **OR**    Watch video lesson and take notes  
 Complete 2-1 practice

### Lesson 2-2 – Binomial Theorem / Pascal’s Triangle

R1: I can apply the binomial theorem to expand a binomial. (A.APR.5)

- Complete guided notes with teacher    **OR**    Watch video lesson and take notes  
 Complete 2-2 practice

### Lesson 2-3 – Synthetic and Long Division

R2: I can rewrite simple rational expressions in different forms including the use of synthetic and long division. (A.APR.6)

- Complete guided notes with teacher    **OR**    Watch video lesson and take notes  
 Complete 2-3 practice

### Quiz 2-1 to 2-3

### Lesson 2-4 – Composition of Functions

R3: I can write a function that describes a relationship between two quantities. (F.BF.1)

K2: I can combine standard functions by addition, subtraction, and multiplication. (F.BF.1b)

R4: I can compose functions. (F.BF.1c)

- Complete guided notes with teacher    **OR**    Watch video lesson and take notes  
 Complete 2-4 practice

### Lesson 2-5 – Inverse of Functions

R5: I can find inverse functions. (F.BF.4 and F.BF.4a)

R6: I can use composite functions to verify inverse function relationships. (F.BF.4b)

K3: I can read values of an inverse function from a graph or table. (F.BF.4c)

- Complete guided notes with teacher    **OR**    Watch video lesson and take notes  
 Complete 2-5 practice

### Quiz 2-4 to 2-5

### UNIT 2 Assessments

- Complete Unit 2 Performance Task (completed after lesson 3)  
 Complete Unit 2 Review Guide  
 Complete Unit 2 Test  
 Complete Unit 2 Reflection

# Advanced Algebra - Unit 2: Operations with Polynomials

## Lesson 2-1: Basic Polynomial Operations

Learning Target: K1: \_\_\_\_\_

### Classifying Polynomials

Name	Examples	Non-Examples
<b>Monomial</b> (one term)	1. $3x^4$ <i>degree:4 or quartic</i> 2. $a^2$ <i>degree:2 or quadratic</i> 3. $5$ <i>degree:0 or constant</i>	1. $2x^{-4}$ 2. $5\sqrt{m}$ 3. $3t^{\frac{2}{3}}$
<b>Binomial</b> (two terms)	1. $2n^3 - n$ <i>degree:3 or cubic</i> 2. $p - 3$ <i>degree:1 or linear(monic)</i> 3. $-3a^3b^4 + a^4b^5$ <i>degree:9 or nonic</i>	1. $\frac{2x+1}{x}$ 2. $\sqrt{c^3 - 2}$
<b>Trinomial</b> (three terms)	1. $-2x^3 + 2x - 3$ <i>degree:3 or cubic</i> 2. $d(d^2 + 2d^4 - 2)$ <i>degree:5 or quintic</i>	1. $x^{-3} + 2x - 5$ 2. $2^x + 3x - 5$
<b>Polynomial</b> (one or more terms)	1. $3x^4 + 2x^3 - 5x + 1$ <i>degree:4 or quartic</i> 2. $5y^6$ <i>degree:6 or sextic</i> 3. $\frac{1}{2}x^2 + \sqrt{3}x^3 - 6x^4 + 1x - 3$ <i>degree:4 or quartic</i>	1. $3q^3 + \frac{p}{q}$ 2. $2^x + 3\sqrt{x}$

### Classifying Polynomials by the number of terms:

1 Term: Monomial                      3 Terms: Trinomial  
 2 Terms: Binomial                      1+ Terms: Polynomial

**Classifying Polynomials by the degree:** The degree of the polynomial is the same as the term with the highest degree.

Degree of 0: Constant                      Degree of 3: Cubic  
 Degree of 1: Linear                      Degree of 4: Quartic  
 Degree of 2: Quadratic                      Degree of 5: Quintic

### You Try:

Polynomial	Number of Terms	Classification	Degree	Classification
$f(x) = 3x - 1$	2	Binomial	1	Linear
$f(x) = -x^5$				
$f(x) = 8x^3 + 125$				
$f(x) = x^4 + 10x^2 + 16$				
$f(x) = x^2 - 2x + 1$				
$f(x) = 2$				

# Advanced Algebra - Unit 2: Operations with Polynomials

## Review of Adding, Subtracting, and Multiplying Polynomials

Expand and Simplify (put your answer in standard form):

1.  $(7x + 3) - (2 - 2x)$

2.  $(5x^3 - 3x^4 - 2x - 9x^2 - 2) + (3x^3 + 2x^2 - 5x - 7)$

3.  $3(x + 4) + 8x$

4.  $-2(3x + 2y) - (5x - 6y) + 2x - 7$

5.  $(2x^2 + 5x) - (6x^2 - 2x)$

6.  $(2x^3 + 5x - 8) + (5x^3 - 9x^2 - 11x + 5)$

7.  $(x + 3)(x + 5)$

8.  $(2x - 5)^2$

9.  $4y^2(y^2 + 2y)$

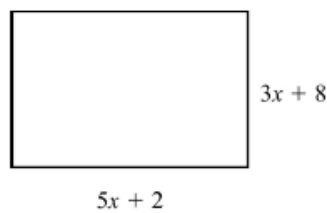
10.  $-6y^2(3y^2 - 2y - 7)$

11.  $(2x + 3)(3x - 5)$

12.  $(2a + 3)(a^2 + 2a - 4)$

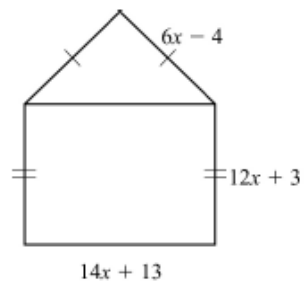
13.  $(x - 2)(x^2 + 4)(2x + 3)$

14. Find the Perimeter:



Find the Area:

15. Find the Perimeter of the given figure:



## Advanced Algebra - Unit 2: Operations with Polynomials

More Practice - Expand and Simplify (put your answer in standard form):

16.  $(3x^2 + 2x - 5) + (x^2 + 3x + 5)$

17.  $(4x^5 - 3x^2 + 8) - (2x^5 + 2x^2 - 1)$

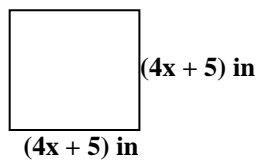
18.  $(x + 1)(2x + 3)$

19.  $(2x^4 + 3x^2 + 7) + (2x^3 - 4)$

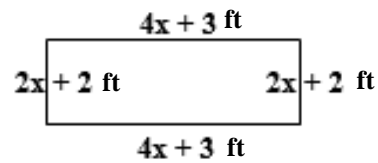
20.  $(2x - 5)(3x^2 - 4x + 6)$

21.  $(x - 4)^3$

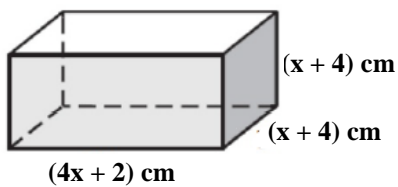
22. Find the Area:



23. Find the Perimeter:



24. Find the volume:



# Advanced Algebra - Unit 2: Operations with Polynomials

## Lesson 2-2: Binomial Theorem – Pascal’s Triangle

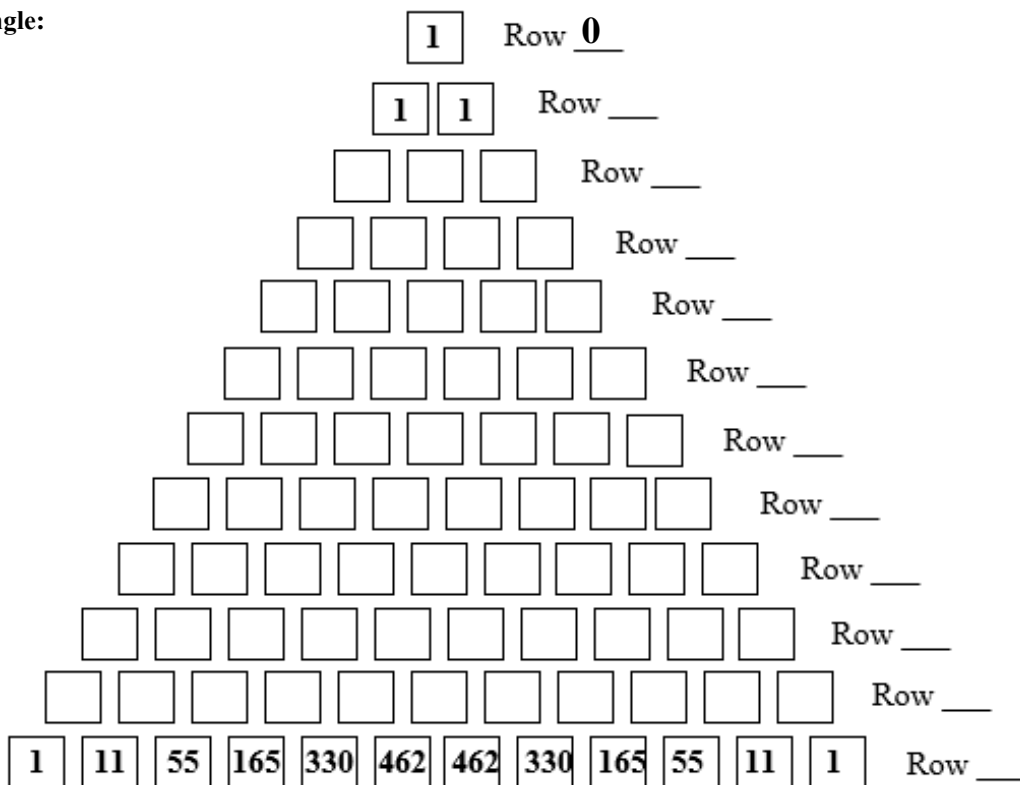
Learning Target: R1: \_\_\_\_\_

What if you were asked to multiply  $(x - 6)^5$  or even worse  $(x - 6)^{13}$ ?

You’d be there a while right?? Wouldn’t you be interested in learning a quicker way??

Pascal’s Triangle and the Binomial Theorem can help!!!

**Pascal’s Triangle:**



**Binomial Theorem:**

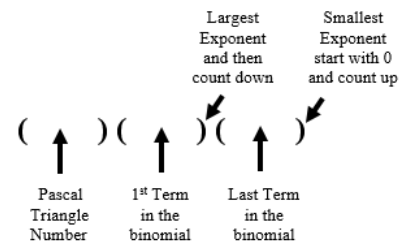
1. Think back to our previous lesson....  $(x + 2)^3$

We multiplied using distribution.

$$\begin{aligned} &(x + 2)(x + 2)(x + 2) \\ &(x + 2)(x^2 + 2x + 2x + 4) \\ &(x + 2)(x^2 + 4x + 4) \\ &x^3 + 4x^2 + 4x + 2x^2 + 8x + 8 \\ &x^3 + 6x^2 + 12x + 8 \end{aligned}$$

2. Let’s try it using Pascal’s Triangle and the Binomial Theorem?

$$(x + 2)^3$$

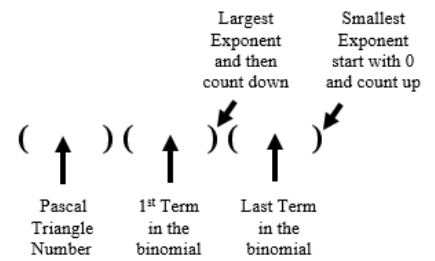




## Advanced Algebra - Unit 2: Operations with Polynomials

3. What about  $(x + 3)^5$ ? Would you want to multiply this all the way out using distribution? You can but let's try it using Pascal's Triangle and the Binomial Theorem.

Notice the number of groupings...  
it is always 1 more than the degree.



4. Expand  $(2x + 3)^4$

### You Try:

1. Expand  $(x + 1)^4$
2. Expand  $(x + 3)^5$
3. Expand  $(3x + 5)^3$

## Advanced Algebra - Unit 2: Operations with Polynomials

To expand binomials representing differences, rather than sums, the binomial coefficients will remain the same but the signs will alternate beginning with positive, then negative, then positive, and so on. Compare the result.

$$(x + 2)^3 = (1)(x^3)(2^0) + (3)(x^2)(2^1) + (3)(x^1)(2^2) + (1)(x^0)(2^3) = x^3 + 6x^2 + 12x + 8$$

$$(x - 2)^3 = (1)(x^3)(2^0) - (3)(x^2)(2^1) + (3)(x^1)(2^2) - (1)(x^0)(2^3) = x^3 - 6x^2 + 12x - 8$$

What do you notice?? \_\_\_\_\_

Ex. Expand  $(x - 2)^4$

Ex. Expand  $(4x - 3)^3$

**You Try:**

1. Expand  $(x - 5)^3$

2. Expand  $(x - 2)^5$

3. Expand  $(2x - 7)^4$

## Advanced Algebra - Unit 2: Operations with Polynomials

Use the Binomial Theorem to answer the following:

Ex. What is 5<sup>th</sup> term of  $(x + 6)^8$ ?

Count down from 8.

8... 7... 6... 5... 4...  $x^4$  would be the 5<sup>th</sup> term.

Ex. What is the 4<sup>th</sup> term of  $(3c + 4)^7$ ?

Count down from 7.

7... 6... 5... 4...  $x^4$  would be the 4<sup>th</sup> term.

Ex. What is just the coefficient of the 5<sup>th</sup> term of  $(2x - 3)^6$ ?

Count down from 6.

6... 5... 4... 3... 2...  $x^2$  would be the 5<sup>th</sup> term.

**You Try:**

1. What is 5<sup>th</sup> term of  $(x + 4)^9$ ?

2. What is just the coefficient of the 3<sup>rd</sup> term of  $(3t + 5)^8$ ?

## Advanced Algebra - Unit 2: Operations with Polynomials

### More Practice:

1.  $(x + 3)^4$

2.  $(x - 4)^3$

3.  $(x + 2)^3$

4.  $(x - 5)^4$

5.  $(x - 1)^7$

6.  $(3x + 2)^6$

7.  $(5x + 3)^3$

8. Find the 5<sup>th</sup> term in the expansion of  $(2x + 4)^{11}$ .

9. Find the 4<sup>th</sup> term in the expansion of  $(3x - 2)^{10}$ .

10. Find just the coefficient of the 2<sup>nd</sup> term in the expansion of  $(x - 3)^7$ .

# Advanced Algebra - Unit 2: Operations with Polynomials

## Lesson 2-3: Synthetic and Long Division

Learning Target: R2: \_\_\_\_\_

### Polynomial Long Division

Ex.  $(2x^2 - 3x + 1) \div (x + 5)$

Ex.  $(3x^2 - x + 4) \div (x - 1)$

Ex.  $(x^4 - 3x^3 - 2x + 1) \div (x^2 + 1)$

You Try:

1.  $(x^2 - 2x + 6) \div (x + 2)$

2.  $(x^2 - 5x - 7) \div (x - 8)$

## Advanced Algebra - Unit 2: Operations with Polynomials

### More Practice with Long Division:

1.  $(x^2 + 3x - 6) \div (x + 1)$

2.  $(x^2 + x - 3) \div (x - 2)$

3.  $(x^4 + 5x^3 + 3x^2 - 8x + 3) \div (x + 3)$

4.  $(4x^4 + 3x^2 + 2x - 2) \div (2x - 1)$

5.  $(2x^3 + 3x^2 + 4x - 5) \div (x - 2)$

6.  $(6x^4 + 3x^3 - 5x^2 + 2x + 4) \div (3x + 1)$

# Advanced Algebra - Unit 2: Operations with Polynomials

## Polynomial Synthetic Division

Ex.  $(x^2 - 4x + 3) \div (x - 1)$

Ex.  $(2x^2 - 5x - 3) \div (x - 3)$

Ex.  $(x^3 - 10x - 24) \div (x - 3)$

Ex.  $(2x^4 - 5x^3 - 7x - 6) \div (x - 3)$

### You Try:

1.  $(x^2 + 2x - 15) \div (x + 4)$

2.  $(4x^4 + 3x^2 + 2x - 2) \div (x - 1)$

## Advanced Algebra - Unit 2: Operations with Polynomials

### More Practice with Synthetic Division:

1.  $(x^2 + 7x + 4) \div (x + 3)$

2.  $(x^2 + 2x + 1) \div (x + 1)$

3.  $(3x^2 + 10x + 8) \div (x + 2)$

4.  $(x^4 + 7x^3 + 17x^2 + 13x - 6) \div (x + 3)$

5.  $(x^4 + 3x^3 + 2x^2 + x - 6) \div (x - 2)$

6.  $(3x^4 + 10x^3 - 6x^2 + 5x - 7) \div (x + 4)$



## Advanced Algebra - Unit 2: Operations with Polynomials

### Review of Polynomial Operations and the Binomial Theorem:

**Add or Subtract the following (Circle your final answer):**

1.  $(10x^2 + 3) + (x^2 + 6x + 8)$

2.  $(-5x^2 + 1) - (6x^2 - 2)$

3.  $(7x^3 + 3x + 1) + (2x^2 - 5x - 9)$

**Multiply the following (Circle your final answer):**

4.  $(x + 7)(4x + 5)$

5.  $(2x - 5)(2x^2 - 3x + 4)$

6.  $(3x + 4)^3$

**Use Pascal's triangle for the following:**

7. Expand  $(x - 2)^3$

8. Expand  $(2x + 3)^4$

9. Find the third term of  $(x - 3)^5$ .

**Divide the following using either Polynomial Long Division or Polynomial Synthetic Division (Circle your final answer):**

10.  $(x^2 + 7x + 8) \div (x + 2)$

11.  $(7x^2 + 5x - 12) \div (2x - 5)$

12.  $(x^3 + 12x^2 + 48x + 64) \div (x + 4)$

13.  $(6x^2 - 13x - 63) \div (2x - 9)$

14.  $(3x^3 - 6x - 4) \div (x + 3)$

15.  $(x^3 - x^2 - 7x - 2) \div (x + 1)$

# Advanced Algebra - Unit 2: Operations with Polynomials

## Lesson 2-4: Composition of Functions

Learning Target: R3: \_\_\_\_\_

Learning Target: K2: \_\_\_\_\_

Learning Target: R4: \_\_\_\_\_

**Evaluate each function:**

1.  $f(4) = 3x - 5$

2.  $g(-7) = x^2 + 9$

3.  $h(x + 3) = 2x - 5$

4.  $f(2) = x^2 - 4x + 1$

5.  $h(3) = 2x - 5$

6.  $p(2x + 3) = 5x + 4$

**Ex. Use the functions  $f(x) = 4x - 2$  and  $g(x) = 3x + 1$  to answer the following questions:**

7.  $f(5) =$

8.  $g(-2) =$

9.  $f(x) + g(x) =$

10.  $f(x) - g(x) =$

11.  $g(x) - f(x) =$

12.  $f(x) \cdot g(x) =$

**You Try: Use the functions  $f(x) = 3x - 4$  and  $g(x) = 4x + 5$  to answer the following questions:**

13.  $f(-7) =$

14.  $g(3) =$

15.  $f(x) + g(x) =$

16.  $f(x) - g(x) =$

17.  $g(x) - f(x) =$

18.  $f(x) \cdot g(x) =$

**Ex. Find  $f(g(x))$  and  $g(f(x))$ . Simplify your answer:**

19.  $f(x) = 2x$        $g(x) = x + 5$

a.  $f(g(x)) =$

b.  $g(f(x)) =$

## Advanced Algebra - Unit 2: Operations with Polynomials

20.  $f(x) = x^2 + 2$      $g(x) = x - 1$

a.  $f(g(x)) =$

b.  $g(f(x)) =$

21.  $f(x) = 3x$      $g(x) = 4x + 9$

a.  $f(g(x)) =$

b.  $g(f(x)) =$

### You Try:

22.  $f(x) = x^2 - 5$      $g(x) = 2x$

a.  $f(g(x)) =$

b.  $g(f(x)) =$

Use the functions  $f(x) = 3x - 5$  and  $g(x) = 2x + 4$  to answer the following questions:

23.  $f(4) =$

24.  $g(5) =$

25.  $f(x) + g(x) =$

26.  $f(x) - g(x) =$

27.  $g(x) - f(x) =$

28.  $f(x) \cdot g(x) =$

29.  $f(g(x)) =$

30.  $g(f(x)) =$

31.  $f(f(x)) =$

# Advanced Algebra - Unit 2: Operations with Polynomials

## Lesson 2-5: Inverse of Functions

### Inverse Functions – Finding an Inverse

Learning Target: R5: \_\_\_\_\_

#### Examples – Find the inverse functions of the following:

STEP 1: Swap x and y (remember f(x), g(x), etc are the same thing as y)

STEP 2: Solve for y

STEP 3: Rewrite in inverse notation ( $f^{-1}(x)$ ,  $g^{-1}(x)$ , etc)

1.  $f(x) = 5x + 3$

2.  $g(x) = \frac{3x+1}{5}$

3.  $h(x) = \frac{x}{2} - 6$

4.  $g(x) = 2x^3 + 6$

#### You Practice:

#### Find the inverse relations for the following:

1.  $g(x) = 5x$

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

3.  $h(x) = -\frac{2}{3}x + 6$

4.  $f(x) = -2x + 5$

5.  $g(x) = 3x - 3$

6.  $h(x) = \frac{1}{2}x + 6$

## Advanced Algebra - Unit 2: Operations with Polynomials

7.  $g(x) = -\frac{4}{5}x + 11$

8.  $f(x) = 11x - 5$

9.  $f(x) = -12x + 7$

10.  $f(x) = 3x - \frac{1}{4}$

11.  $g(x) = 8x - 13$

12.  $h(x) = -\frac{3}{7}x + \frac{5}{7}$

13.  $f(x) = x^7 + 4$

14.  $f(x) = 3x^3$

15.  $f(x) = x^3 + 2$

16.  $f(x) = \frac{3}{5}x^3 - 9$

17.  $f(x) = x^4 - \frac{1}{2}$

18.  $f(x) = \frac{1}{6}x^5 + \frac{2}{3}$

## Advanced Algebra - Unit 2: Operations with Polynomials

### Inverse Functions – Verifying Inverses

Learning Target: R6: \_\_\_\_\_

**Example: Verify whether or not the following are inverse functions:**

STEP 1: Use composition of functions. For example, find  $f(g(x))$  and  $g(f(x))$ .

STEP 2: Compare the solutions. If both solutions is equal to  $x$  the functions are inverses of each other.

Ex 1:  $f(x) = 4x$  and  $g(x) = \frac{x}{4}$

Ex 2:  $f(x) = 2x + 1$  and  $g(x) = \frac{x-1}{2}$

Ex 3:  $f(x) = \frac{x}{2} - 3$  and  $g(x) = 2x + 3$

Ex 4:  $f(x) = 2x^3 - 1$  and  $g(x) = \sqrt[3]{\frac{x+1}{2}}$

**You Try:**

1.  $f(x) = 2x - 4$  and  $g(x) = \frac{1}{2}x + 2$

2.  $f(x) = 8x^3$  and  $g(x) = \frac{x^{1/3}}{2}$

3.  $f(x) = 6x + 3$  and  $g(x) = \frac{1}{6}x - \frac{1}{2}$

4.  $f(x) = x + 7$  and  $g(x) = x - 7$

## Advanced Algebra - Unit 2: Operations with Polynomials

5.  $f(x) = 3x - 1$  and  $g(x) = \frac{1}{3}x + \frac{1}{3}$

6.  $f(x) = \frac{1}{2}x + 1$  and  $g(x) = 2x - 2$

7.  $f(x) = -2x + 4$  and  $g(x) = -\frac{1}{2}x + 2$

8.  $f(x) = 3x^3 + 1$  and  $g(x) = \left(\frac{x-1}{3}\right)^{1/3}$

### Inverse Functions – Inverses using graphs and tables

Learning Target: K3: \_\_\_\_\_

1. Which function is the inverse of the first table shown?

$x$	$f(x)$
-2	0
-1	2
0	-2
2	-1

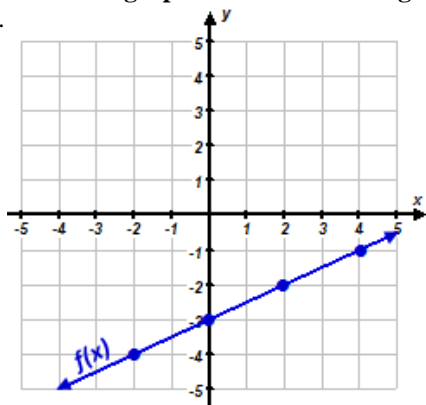
$x$	$g(x)$
0	-2
2	-1
-2	0
-1	2

$x$	$h(x)$
-2	-1
-1	-2
0	2
2	0

## Advanced Algebra - Unit 2: Operations with Polynomials

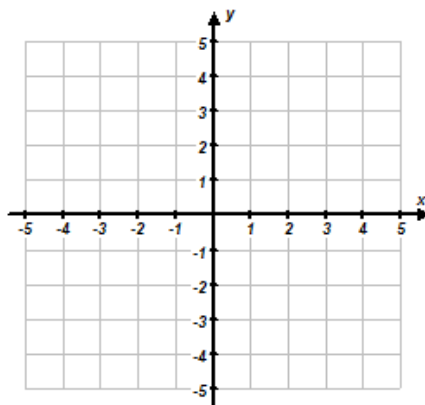
2. Given the graph create an inverse graph and determine if the inverse is a function.

a.

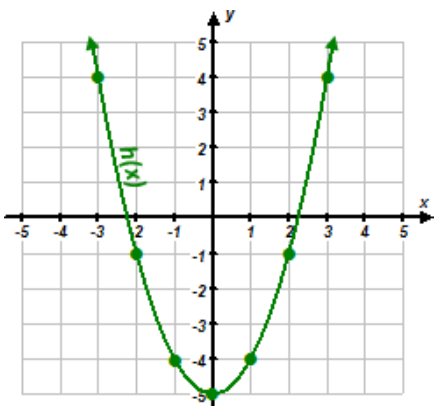


Create an  
inverse of the  
graph shown

Is the inverse a  
function?  
CIRCLE ONE:  
YES NO

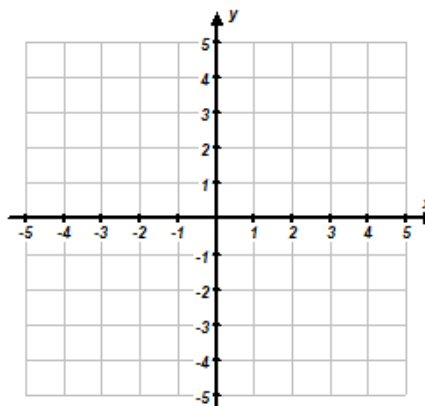


b.

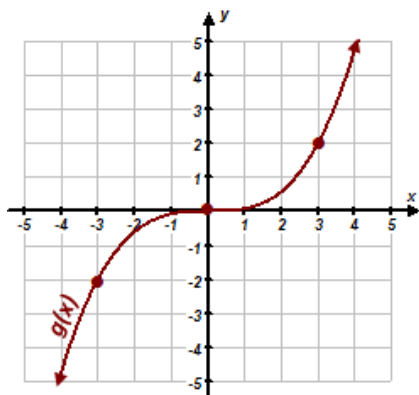


Create an  
inverse of the  
graph shown

Is the inverse a  
function?  
CIRCLE ONE:  
YES NO

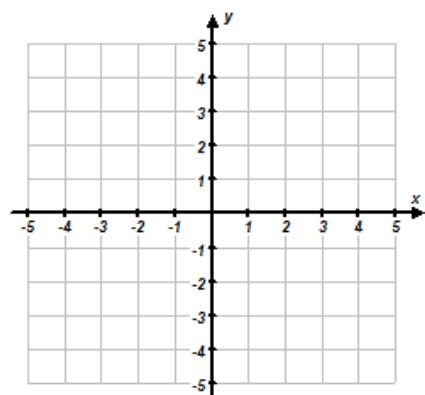


c.

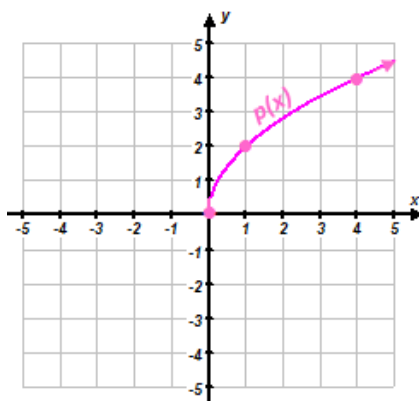


Create an  
inverse of the  
graph shown

Is the inverse a  
function?  
CIRCLE ONE:  
YES NO

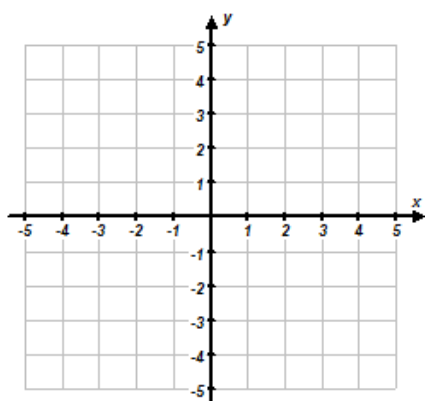


d.



Create an  
inverse of the  
graph shown

Is the inverse a  
function?  
CIRCLE ONE:  
YES NO





# Advanced Algebra - Unit 2: Operations with Polynomials

## UNIT 2 STUDY GUIDE

Using  $7x + 3x^3 + 1x^2$ , answer the following:

1. Write in standard form. \_\_\_\_\_
2. What is the leading coefficient? \_\_\_\_\_
3. What is the constant? \_\_\_\_\_
4. How many terms? \_\_\_\_\_
5. What is the degree? \_\_\_\_\_
6. Classify by degree \_\_\_\_\_, classify by number of terms \_\_\_\_\_.

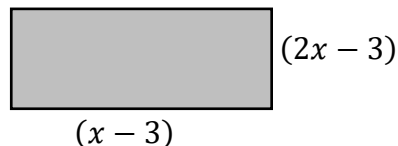
### Add, Subtract, or Multiply Polynomials

7.  $(x^2 - 4x + 12) + (x - 5)$

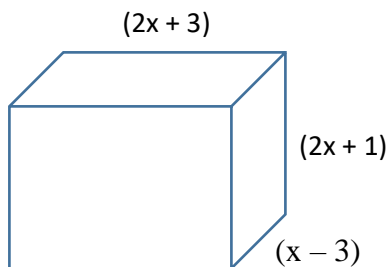
8.  $(x^2 + 5x - 6) - (x^2 - 3x + 4)$

9.  $(2x + 3)(x - 2)$

10. Find the area of the rectangle:



11. Find the volume (no parentheses in answer).



## Advanced Algebra - Unit 2: Operations with Polynomials

### Polynomials Division:

12.  $(3x^3 + 10x^2 + 13x + 10) \div (x + 2)$

13.  $(3x^2 + 4x - 6) \div (x - 3)$

14.  $(3x^3 + 10x^2 + 13x + 10) \div (x + 2)$

15.  $(6x^2 + 9x - 15) \div (2x + 5)$

### Use Pascal's triangle for the following:

16. Expand  $(x - 2)^3$

17. Find the third term of  $(x - 3)^5$ .

18. Expand  $(2x + 3)^4$

19.  $(x - 13)^1 =$

### Use Composition of Functions:

20.  $f(x) = x^2$  and  $g(x) = x^2 + 5$

a. Find  $f(x) + g(x)$

b. Find  $f(x) - g(x)$

c. Find  $f(4)$

d. Find  $f(x) \cdot g(x)$

e. Find  $f(g(x))$

f. Find  $g(f(x))$

## Advanced Algebra - Unit 2: Operations with Polynomials

**Find the Inverse:**

21.  $f(x) = 2x^3 + 1$ , find  $f^{-1}(x)$

22.  $f(x) = 6x - 2$ , find  $f^{-1}(x)$

**Verify “if” the following functions are inverses.**

23.  $f(x) = x^2 + 2$                        $g(x) = \sqrt{x - 2}$

24.  $f(x) = 2x - 7$                        $g(x) = \frac{x-7}{2}$

25. Create a Table that reflects the inverse of the given table.

$x$	$h(x)$
-2	-1
-1	-2
0	2
2	0

$x$	$h^{-1}(x)$

## Advanced Algebra - Unit 2: Operations with Polynomials

**UNIT 2 Reflection**

**Name:** \_\_\_\_\_ **Period:** \_\_\_\_\_

Do you feel like you stay on task during class? \_\_\_\_\_

Do you feel like you are struggling with the content? \_\_\_\_\_

What do you think is your biggest distraction in class? \_\_\_\_\_

\_\_\_\_\_

What about this unit did you find to be the easiest? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

What about this unit did you find to be the most difficult? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

How can I help you be more successful? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_