

March 4, 2019, Monday

sub work

March 5, 2019, Tuesday

Determine if the sequence is geometric. If it is, find the common ratio.

1) 1) 4, 16, 64, 256... YES  $r = \frac{16}{4} = 4$

2) 2, 5, 10, 17... NO!

3) -2, -6, 18, -54... YES  $r = \frac{-6}{-2} = 3$

4) 3, 9, 27, 81... YES  $r = \frac{9}{3} = 3$

5) -2, 4, -8, 16... YES  $r = \frac{4}{-2} = -2$

6) -1, -2, -4, -8... YES  $r = \frac{-2}{-1} = 2$

7) Find the three terms in the sequence after the last one given.

1)  $a_n = 256(2.5)^{n-1}$

2)  $a_n = 3(a_{n-1})$

3)  $a_n = 2(3)^{n-1}$

4)  $a_n = 2(3)^{n-1}$

5)  $a_n = -2a_{n-1}$

6)  $a_n = -1(2)^{n-1}$

...test

Feb 28-8:11 AM

Feb 28-8:11 AM

Algebra 1 - Day 4, 3/1/2018 Unit 4 Test Review

1) Write an explicit rule and find the 10th term: 256, 64, 16, 4, ...

$r = \frac{64}{256} = 0.25$

$a_n = 256(0.25)^{n-1}$

$a_{10} = 256(0.25)^9 = 1$

2) Find the first three terms.

$a_n = 3(a_{n-1})$

$a_n = 2(3)^{n-1}$

3) Given that a sequence is geometric, find the first three terms.

$a_n = a_1 r^{n-1}$

$98415 = a_1 (0.1)^{10}$

$5 = a_1$

$(-2)^n$

4) For each of the functions, identify the characteristics.

Graph 1:  $f(x) = 2^x - 3$

Graph 2:  $f(x) = 2^{-x} + 3$

Domain:  $\mathbb{R}$

Range:  $y > -3$

x-intercept:  $x \rightarrow \infty, f(x) \rightarrow \infty$

y-intercept:  $x \rightarrow 0, f(x) \rightarrow 3$

End Behavior:  $x \rightarrow \infty, f(x) \rightarrow \infty$

5) Graph the function  $f(x) = 2^x + 3$

Domain:  $\mathbb{R}$

Range:  $y > 3$

x-intercept:  $x \rightarrow \infty, f(x) \rightarrow \infty$

y-intercept:  $x \rightarrow 0, f(x) \rightarrow 4$

End Behavior:  $x \rightarrow \infty, f(x) \rightarrow \infty$

6) Describe the transformations made to  $f(x) = 3^x$  to get:

a)  $f(x) = 2^x + 5$

b)  $f(x) = 3^x + 1$

Exponential Equation

$y = ab^x + k$

$\pm k$ : reflection

$\pm b$ : steepness

$\pm$ : reflection

$2$ : steepness

$+1$ : left one

7) Write an equation for the given description:

Exponential that has a base of 4, stretched by 3, moved right 7, and up by 1.

Exponential Equation

$y = ab^x + k$

$y = 3(4)^{x-7} + 1$

8) Given the equation  $y = 1.075^x$

a. Does the equation represent growth or decay?

b. What is the growth factor?

c. What is the rate of growth?

d. What is the initial value?

e. Evaluate for  $x = 9$

$y = 1.075^9 = 1.838$

9) Write an explicit formula and describe the formula to model the number of dots per day.

$E: a_n = 2(3)^{n-1}$

$R: a_n = 3(a_{n-1})$

How many dots will there be on day 7?

$a_7 = 2(3)^6 = 1458$

10) Taylor is training for a marathon. He decides to begin by running 3 miles and increase by 1/5 miles each day. Write an equation to represent the number of miles he runs each day. How long will it take him to run 100 miles?

$a_n = 3(1.5)^{n-1}$

$26.2 = 3(1.5)^{n-1}$

$8.7 = 1.5^{n-1}$

Guessing n's...

$1.5^3 = 2.25$

$1.5^5 = 5.06$

$1.5^9 = 25.6$

$1.5^{10} = 3$

11) You bought a Boston Whaler in 2004 for \$2,500. The boat's value depreciates by 7% a year. How much is the boat worth now? How much is it worth in 2020?

Compound Interest Formula

$A = P(1 + \frac{r}{n})^{nt}$

$A = 2500(1 - 0.07)^{15}$

$A = 12500(1 - 0.07)^{16}$

12) The population of a large city increases by a rate of 3% a year. When the 2000 census was taken, the population was 1.2 million.

a) Write a model for this population growth.

Compound Interest Formula

$A = P(1 + \frac{r}{n})^{nt}$

$A = 1.2(1 + 0.03)^t$

b) What should the population be in 2019? What is the projected population in 2020?

$t = 2019 - 2000 = 19$

$A = 1.2(1 + 0.03)^{19} = 2.1$  million

$A = 1.2(1 + 0.03)^{20} = 2.16$  million

13) Which function represents the sequence?

A.  $3^{n-1}$

B.  $6(3)^n$

C.  $6(3)^{n-1}$

D.  $6(3)^{n+1}$

14) Which function shows the function  $f(x) = 3^x$  being translated 5 units to the left?

A.  $f(x) = 3^x - 5$

B.  $f(x) = 3^{x+5}$

C.  $f(x) = 3^{x-5}$

D.  $f(x) = 3^x + 5$

15) The table represents an exponential function. Write the equation that represents the function.

x	1	2	3	4
y	12	48	192	768

Exponential Equation

$y = 3(4)^x$

16) True or False: An exponential function will always have an x-intercept.

17) True or False: An exponential function will always have a y-intercept.

18) Is the graph of the following function increasing or decreasing?  $f(x) = 5^x$

19) The table below describes an exponential function.

x	0	1	2	3
f(x)	22	16	12	9

a) Is the function exponential growth or exponential decay?

b) Write the equation of the function.

Exponential Equation

$y = 64(0.5)^x$

20) An item is purchased for \$4000 and it depreciates in value 10% per year. Write an equation to describe the value of the item in 7 years.

Compound Interest Formula

$A = P(1 + \frac{r}{n})^{nt}$

$A = 4000(1 - 0.10)^7$

21) Given the function  $y = 2(2)^{x-1} + 4$

a) Does the function represent growth or decay?

b) What is the equation of the asymptote?

c) Describe the transformations that occur:

22) Given the function  $y = 5(3)^{-x} + 2$

a) Does the function represent growth or decay?

b) What is the equation of the asymptote?

c) Describe the transformations that occur:

March 6, 2019, Wednesday

The function  $f(x) = 2^x + 1$  is modeled on the graph below. Use the graph to answer questions #6-7.

6th & 11th term  
The table shows a given sequence. If the pattern continues, find the 6th term of the sequence. MGSE9-12.F.BF.2

Term Number	1	2	3	4	5	6
Sequence	2	4	8	16	32	64

$r = \frac{4}{2} = 2$

7) What is the domain of the function? MGSE9-12.F.BF.4

a)  $(-\infty, \infty)$   $\mathbb{R}$   $(-\infty, \infty) = \mathbb{R}$   
 b)  $(0, \infty)$   
 c)  $(1, \infty)$  ← Range  
 d)  $(-\infty, 1)$

8) Use the graph above to fill in the blank. MGSE9-12.F.BF.4  
 End behavior: As  $x \rightarrow \infty$ ,  $y \rightarrow$  \_\_\_\_\_. ...test

a)  $-\infty$   
 b)  $\infty$   
 c) 0  
 d) 1

Feb 28-8:11 AM

You can skip any TWO of the multiple choice questions. Please write "SKIP" largely!

Mar 6-8:55 AM

Copy 3 of the problems, to turn in.

Answer the question, what is factoring?

<https://www.youtube.com/watch?v=VKAYqzRp4o>

Mar 6-8:26 AM

March 7, 2019, Thursday

2) Given the function  $y = 2\left(\frac{1}{3}\right)^{2x+1} - 5$ ,  
 a) Does the function represent an exponential growth or exponential decay?  
 b) What is the equation of the asymptote?  
 $y =$  \_\_\_\_\_

1) Samir made a pattern shown below. What number belongs in the position indicated by the question mark? MGSE9-12.F.BF.2

9.3.1  $\frac{1}{3}, \frac{1}{9}, \frac{1}{27}, \dots$

10) Which table best describes a function with exponential decay? MGSE9-12.F.BF.4

a) 

x	f(x)
1	81
2	27
3	9
4	3

b) 

x	f(x)
1	80
2	70
3	60
4	50

c) 

x	f(x)
1	80
2	76
3	72
4	68

d) 

x	f(x)
1	2
2	4
3	8
4	16

Feb 28-8:13 AM

GCF = Greatest Common Factor  
 Multiplying and factoring are opposite operations.

GSE Algebra I Unit 3A - Factoring Quadratics

Name: \_\_\_\_\_ Date: \_\_\_\_\_

### GCF Factoring

Introduction to Factoring out GCF

\*Factor\* simply means to DISTRIBUTE + MULTIPLY = DIVIDE!

Distributed Version	Factored Version
$5x^2 + 15x$	$5x(x + 3)$
$2x^3 - 8x^2$	$2x^2(x - 4)$
$2x^2 - 4x$	$2x(x - 2)$
$15x^2 - 5x + 30$	$5(3x^2 - x + 6)$

More formal Definition:  
 Factoring: Writing the polynomial as a product.

Steps to Factoring Out a GCF:

- Find the GCF of all its terms (number and/or variables). For variables ALL the terms must have the variable. Choose the smallest exponent!
- The GCF goes to the LEFT!
- Write the polynomial as a product by dividing the original terms of the polynomial by the GCF.
- The remaining factors in each term will form a polynomial. You'll always have the same number of terms you started with.

Factor using a GCF:

$4x + 6y$   
 $2(2x + 3y)$

$6x^2 - 9x^2 + 12x$   
 $3x(2x - 3x + 4)$

$y^2 - y^2 + y^2$   
 $y^2(y^0 - y^0 + 1)$

Feb 28-9:04 AM

GSE Algebra I Unit 3A - Factoring Quadratics

FACTICE: Factor each polynomial using a GCF.

1.  $18x + 45$   
 $3(2x + 7)$

2.  $28x - 63$   
 $7(2x - 9)$

3.  $18a + 42$   
 $3(6a + 7)$

4.  $8x + 24$   
 $8(x + 3)$

5.  $18x^2 - 15x + 39$

6.  $27a^2 + 81$

7.  $72a^3 + 33a^2 - 42a$   
 $3a(24a^2 + 11a - 14)$

8.  $15x^3 + 30x^2 - 45x$   
 $15x^2(x + 2 - 3)$

9.  $4x^3 + 16x^2 - 44x$   
 $4x(x^2 + 4x - 11)$

10.  $14x^2 + 7x - 42$   
 $7(2x^2 + x - 6)$

Feb 28-9:04 AM

Name \_\_\_\_\_ Date \_\_\_\_\_

-Factoring the difference of two squares Notes-

What is the difference of two squares?

- Must have **2 perfect squares** *perfect 3x, sq? 4=2x2, 9=3x3, 16=4x4, 25=5x5, 49=7x7*
- Must have **minus** (difference)
- Binomial** is a **binomial** square if the **monomial** is an **square number**.

*→ 2 terms, 4x²-81 and x²-16 → 1 term*

$a^2 - b^2 = (a+b)(a-b)$  ← This is the difference of 2 squares pattern.

Examples:

1. $x^2 - 16$ $a = x, b = 4$ $(x+4)(x-4)$	2. $x^2 - 100$ $a = x, b = 10$ $(x+10)(x-10)$
3. $4x^2 - 25$ $a = 2x, b = 5$ $(2x+5)(2x-5)$	4. $9 - y^2$ $a = 3, b = y$ $(3+y)(3-y)$
5. $2x^2 - 8$ $a = x, b = 2$ GCF $2(x^2 - 4)$ $2(x+2)(x-2)$	

Extra Practice:

1) $9x^2 - 1$ $a = 3x, b = 1$ $(3x+1)(3x-1)$	2) $4n^2 - 49$
3) $36k^2 - 1$ $a = 6k, b = 1$ $(6k+1)(6k-1)$	4) $p^2 - 36$
5) $2x^2 - 18$	6) $196n^2 - 144$

Mar 1-8:44 AM

GSE Algebra I Name \_\_\_\_\_ Date \_\_\_\_\_

Difference of Two Perfect Squares ( $a^2 - b^2$ )

1. $n^2 - 25$	2. $4x^2 - 121y^2$
3. $196z^2 - 1$	4. $100x^2 - 49$
5. $2x^2 - 162x$	6. $16x^2 - 36$
7. $8x^2 - 18$	8. $15x^2 - 60y^2$
9. $68k^2 - 17$	10. $25x^2 - 49y^2$
11. $50x^4 - 98x^2y^2$	12. $45x^2 - 20y^2$

Mar 1-8:46 AM

March 8, 2019, Friday

Factor the common factor out of each expression, if possible.

- $-5x^2 - 10x^2 - 20$
- $9x^3 + 9x + 2$
- $4x^3 + 3x^2 + 5$

Feb 28-8:13 AM

Intro to Factoring Quadratics Name \_\_\_\_\_

- Find two numbers that sum to 8 and have a product of 12 \_\_\_\_\_
- Find two numbers that sum to 5 and have a product of 6 \_\_\_\_\_
- Find two numbers that sum to 5 and have a product of -14 \_\_\_\_\_
- Find two numbers that sum to -8 and have a product of 12 \_\_\_\_\_
- Find two numbers that sum to 16 and have a product of 15 \_\_\_\_\_
- Find two numbers that sum to -4 and have a product of -21 \_\_\_\_\_
- Find two numbers that sum to 1 and have a product of -56 \_\_\_\_\_
- Find two numbers that sum to -14 and have a product of 40 \_\_\_\_\_
- Find two numbers that sum to 0 and have a product of -25 \_\_\_\_\_
- Find two numbers that sum to 8 and have a product of 16 \_\_\_\_\_

11. Multiply the following:

a.  $(x + 6)(x + 3)$       b.  $(x + 7)(x - 2)$

$x^2 + \_\_x + \_\_$        $x^2 + \_\_x + \_\_$

Notice: What is the sum of the constants in each binomial above?

Notice: What is the product of the constants in each binomial above?

Notice: What is the sum of the constants in each binomial above?

Notice: What is the product of the constants in each binomial above?

Feb 28-9:09 AM

Unit 3a Day 2 Notes - Factoring Trinomials when  $a = 1$

MCC.12.A.3E.3a] can factor a quadratic expression to reveal the zeroes of the function it defines.

Now let's factor trinomials (3 terms)

- Remember, we undo multiplying!

Example 1:  $x^2 + 5x + 6$

- Is there a GCF? Yes or No

To factor a trinomial, it breaks down into a product of binomials (2 terms each)

What are the factors of 6 (what pairs multiply to 6)? Which pair adds to be 5?

Answer: (x + 2)(x + 3)

Now you try!

1. $x^2 + 7x + 12$	2. $x^2 + 12x + 20$
3. $x^2 + 8x + 12$	4. $x^2 + 6x + 9$
5. $x^2 - x - 12$	6. $x^2 - 2x - 24$
7. $x^2 - 6x + 8$	8. $x^2 - 11x + 24$

Feb 28-9:10 AM

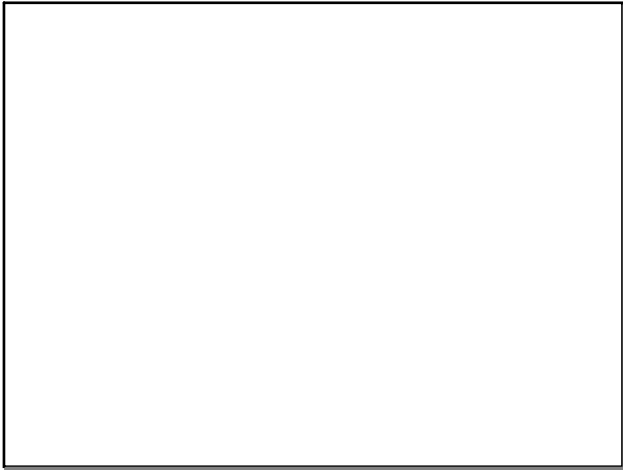
GSE Algebra I Unit 3A - Factoring Quadratics Name \_\_\_\_\_ Date \_\_\_\_\_

Factoring Trinomials ( $ax^2 + bx + c$ )

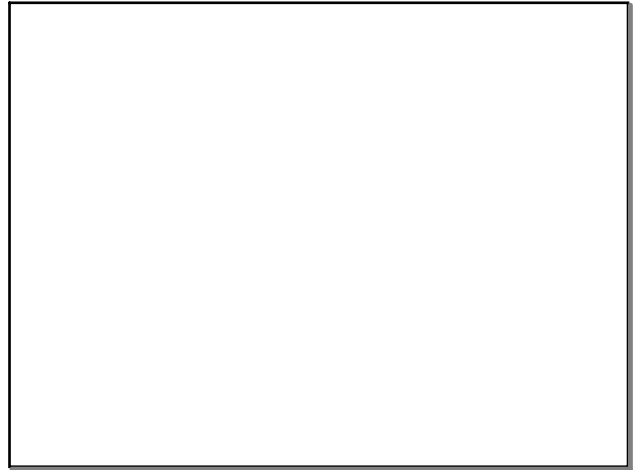
Factor each binomial completely. \*Hint - #8-10 take out a GCF 1st!

1. $x^2 - 5x - 14$	2. $x^2 - 2x - 24$
3. $x^2 + x - 20$	4. $x^2 - 5x - 66$
5. $x^2 - 10x - 24$	6. $x^2 + 7x - 18$
7. $x^2 - 6x - 16$	8. $2x^2 + 12x^2 + 18x$
9. $3x^2 + 12x - 63$	10. $2x^3 - 6x^2 - 20x$

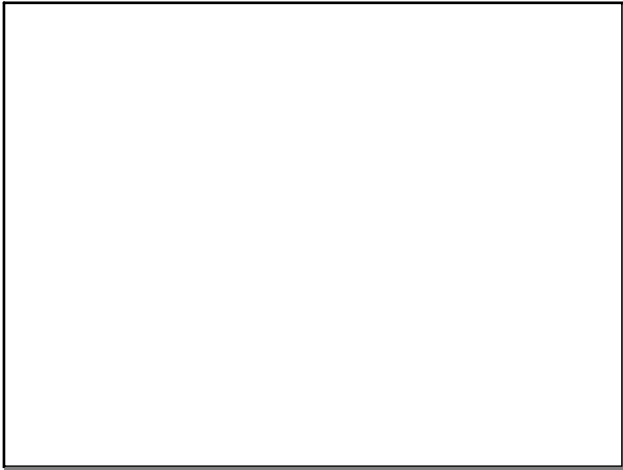
Feb 28-8:44 AM



Feb 28-8:44 AM



Feb 28-8:46 AM



Feb 28-9:26 AM

GSE Algebra 1 Name \_\_\_\_\_

**Compare/Contrast: Linear, Quadratic, and Exponential Functions Notes**

Attribute	Linear Functions	Quadratic Functions	Exponential Functions
Rate of change			
Domain & Range			
Intercepts			
Asymptotes			
End Behavior			

Feb 28-8:39 AM

Examples

Attribute	Linear Functions	Quadratic Functions	Exponential Functions
Rate of change			
Domain & Range			
Intercepts			
Asymptotes			
End Behavior			

Functions to Graph and Discuss:

$f(x) = 2x + 3$

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

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

Feb 28-8:40 AM

4. The graph represents a quadratic function.

a. Extrema: \_\_\_\_\_ b. Axis of Sym: \_\_\_\_\_

c. Zero: \_\_\_\_\_ d. y-intercept: \_\_\_\_\_

e. Domain: \_\_\_\_\_ f. Range: \_\_\_\_\_

g. Increasing: \_\_\_\_\_ h. Decreasing: \_\_\_\_\_

5. The quadratic function  $f(x)$  has these characteristics:

- The vertex is located at  $(6, -2)$ .
- The range is  $-2 < f(x) < \infty$ .

Which graph could be  $f(x)$ ?

a) b)

c) d)

6. Use the information for a given quadratic function to sketch a picture of the function.

Domain:  $- \infty < x < \infty$   
 Range:  $y \geq -2$   
 Increasing:  $-1 < x < 1$   
 Decreasing:  $- \infty < x < -1$   
 There is no stretch or shrink ( $a = 1$ )

Feb 28-8:49 AM



Feb 28-9:11 AM



Feb 28-8:50 AM