

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!

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

3) $-2, -6, 18, -54, \dots$ $r = -\frac{6}{-2} = 3$ $-162, -486, -1458$

4) 3, 9, 27, 81... $r = \frac{9}{3} = 3$ $243, 729, 2187$

F) Find the recursive formula.

5) $-2, 4, -8, 16, \dots$ $r = 2$
 $a_n = -2a_{n-1}$

F) Find the explicit formula.

6) $-1, -2, -4, -8, \dots$ $r = 2$
 $a_n = -1(2)^{n-1}$

...test

Feb 28-8:11 AM

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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: $a_1 = 162, a_2 = 486, a_3 = 1458$
 $r = 3$
 $a_n = 3(a_{n-1})$
 $a_n = 2(3)^{n-1}$

3) Given that a sequence is geometric, find the common ratio and the first term.
 $9845 = a_1 \cdot 1.07^{13}$
 $19783 = a_1 \cdot 1.07^{14}$
 $r = 1.07$
 $5 = a_1$
 $(-1, 4)$
 $m = \frac{1-4}{2-1} = -3$

For each of the functions, identify the characteristics.

4) Graph the function $f(x) = 2^{x-3} - 3$

Domain: $-\infty < x < \infty$
 Range: $y > -3$
 x-intercept: $x \rightarrow 0, f(x) \rightarrow 0$
 y-intercept: $x \rightarrow 0, f(x) \rightarrow 3$
 Growth or Decay: Growth
 End Behavior: $x \rightarrow \infty, f(x) \rightarrow \infty$
 $x \rightarrow -\infty, f(x) \rightarrow -3$

5) Graph the function $f(x) = 2^{x+4} - 1$

Domain: $-\infty < x < \infty$
 Range: $y > -1$
 x-intercept: $x \rightarrow -4, f(x) \rightarrow 0$
 y-intercept: $x \rightarrow 0, f(x) \rightarrow 15$
 Growth or Decay: Growth
 End Behavior: $x \rightarrow \infty, f(x) \rightarrow \infty$
 $x \rightarrow -\infty, f(x) \rightarrow -1$

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

a) $g(x) = 2^{x+5} + 5$
 Steepness: 2
 Right: 2
 Up: 5

b) $g(x) = 3^{x-2} - 1$
 Reflection: reflection
 Steepness: 3
 Right: 2
 Down: 1

Exponential Equation
 $y = ab^{x-h} + k$
 Left vs right
 Up vs down

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

8) Given the equation $y = 1.075^x$, does the equation represent growth or decay?
 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 $x = 9$
 $y = 650(1.075)^9 = 10242$

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

Day 1: 2 dots
 Day 2: 6 dots
 Day 3: 18 dots
 $r = \frac{6}{2} = 3$

Explicit Formula: $a_n = 2(3)^{n-1}$
 Recursive Formula: $R: a_n = 3(a_{n-1})$
 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?

$a_n = 3(1.2)^{n-1}$
 $26.2 = 3(1.2)^{n-1}$
 $8.7 = 1.2^{n-1}$
 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 \$12,500. The boat's value depreciates by 7% a year. How much is the boat worth now? How much is it worth in 2020?
 Hint: $n = 1$
 $2019 - 2004 = 15$
 $2020 - 2004 = 16$
 Compound Interest Formula
 $A = P(1 + \frac{r}{n})^{nt}$
 $A = 12500(1 - 0.07)^{15} = 4208$
 $A = 12500(1 - 0.07)^{16} = 3914$

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.
 Hint: $n = 1$
 Compound Interest Formula
 $A = P(1 + \frac{r}{n})^{nt}$
 $A = 1.2(1 + 0.03)^t$
 What is the projected population in 2019?
 $t = 2019 - 2000 = 19$
 $A = 1.2(1 + 0.03)^{19} = 2.1$ 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. $6(3)^{n+1}$
 $r = 3$

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
 $y = 3(4)^x$
 $b = r = \frac{48}{12} = 4$

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? $f(x) = 5^{x-2}$

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?
 $b = \frac{16}{22} = \frac{8}{11} = 0.727$

b) Write the equation of the function.
 Exponential Equation
 $y = 64(0.5)^x$
 $r = 0.5$

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:
 Steepness: 2
 Right: 1
 Up: 4

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

a) Does the function represent growth or decay?
 b) What is the equation of the asymptote?
 c) Describe the transformations that occur:
 Steepness: 5
 Left: 2
 Down: 3

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.

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

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

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

8) Use the graph above to fill in the blank. End behavior: As $x \rightarrow \infty$, $y \rightarrow$ ____.

a) $-\infty$
b) ∞
c) 0
d) 1

...test

Feb 28-8:11 AM

March 7, 2019, Thursday

1) Samir made a pattern shown below. What number belongs in the position indicated by the question mark?
 $9, 3, 1, \frac{1}{3}, \frac{1}{9}, \frac{1}{27}, \dots$

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

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

Feb 28-8:13 AM

GSE Algebra I Unit 3A - Factoring Quadratics

Name: _____ Date: _____

GCF Factoring

Introduction to Factoring out GCF

*"Factor" simply means to **UNDISTRIBUTE**.*

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

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:

● $4x + 6y$ ● $6x^2 - 9x^2 + 12x$ ● $y^3 - y^2 + y^2$

Feb 28-9:04 AM

GSE Algebra I Unit 3A - Factoring Quadratics

Name: _____ Date: _____

FRACISE: Factor each polynomial using a GCF.

- $10x + 45$
- $28x - 63$
- $18a + 42$
- $8x + 24$
- $18x^2 - 15x + 39$
- $27a^2 + 81$
- $72a^2 + 33a^2 - 42a^2$
- $15x^2 + 30x^2 - 45x^2$
- $4x^2 + 16x^2 - 44$
- $10, 14x^2 + 7x - 42$

Feb 28-9:04 AM

Name: _____ Date: _____

-Factoring the difference of two squares Notes-

What is the difference of two squares?

- Must have _____ squares
- Must have _____ (difference)
- A _____ is a _____ square if the _____ is an _____ number.

$4x^2 - 81$ and $x^2 - 16$

Examples:

1. $x^2 - 16$	2. $x^2 - 100$
3. $4x^2 - 25$	4. $9 - y^2$
5. $2x^2 - 8$	

Extra Practice:

- $9x^2 - 1$
- $4m^2 - 49$
- $36k^2 - 1$
- $p^2 - 36$
- $2x^2 - 18$
- $196n^2 - 144$

Mar 1-8:44 AM

GSE Algebra I

Name: _____ Date: _____

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

1. $m^2 - 25$	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. $68x^2 - 17$	10. $25x^2 - 49y^2$
11. $50x^2 - 98x^2y^2$	12. $45x^2 - 20y^2$

Mar 1-8:46 AM

March 8, 2019, Friday

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

1) $-5v^3 - 10v^2 - 20$ 2) $9x^2 + 9x + 12$

3) $4x^3 + 3x^2 + 5$

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

$x^2 + \underline{\hspace{1cm}}x + \underline{\hspace{1cm}}$ $x^2 + \underline{\hspace{1cm}}x + \underline{\hspace{1cm}}$

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

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Feb 28-9:09 AM

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

MCC9-12.A.5E.3a-1 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: $x^2 + 5x + 4$

1. 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 4 (what pairs multiply to 4)? Which pair adds to be 5?

Answer: (x + 1)(x + 4)

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. $x^2 - 11x + 24$

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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. $2x^2 - 6x^2 - 20x$

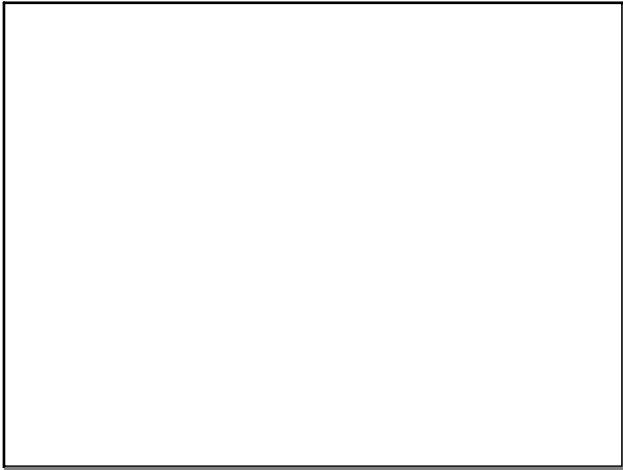
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Feb 28-8:46 AM



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			

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Examples

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

Functions to Graph and Discuss:

$f(x) = 2x + 3$

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

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

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4. This graph represents a quadratic function.

a. Extremum: _____ 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 $-2 \leq f(x) < \infty$.

Which graph could be $f(x)$?

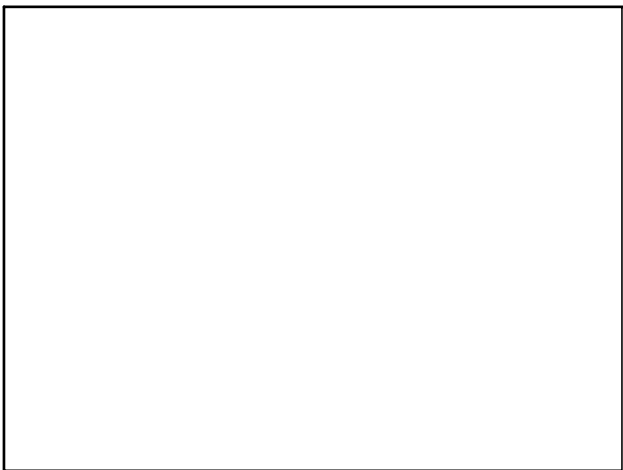
a) b) c) d)

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

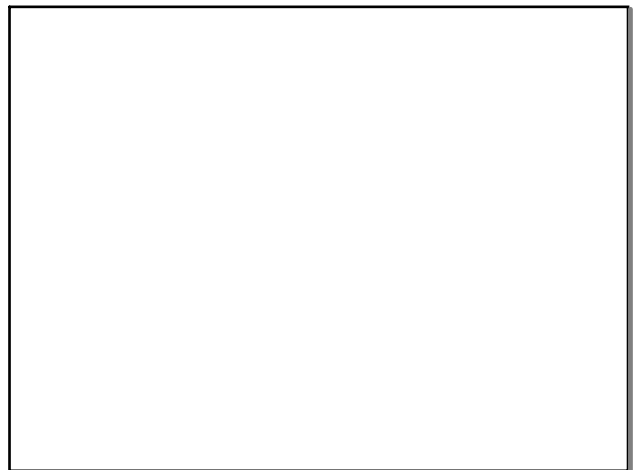
Domain: $-6 < x < 6$
 Range: $y > -2$
 Increasing: $-1 < x < 6$
 Decreasing: $-6 < x < -1$

There is no stretch or shrink ($a = 1$)

Feb 28-8:49 AM



Feb 28-9:11 AM



Feb 28-8:50 AM