Name: **Key**   Date: _____

What you need to know & be able to do	Things to remember	Problem	
Transformations	Negative in front reflects across x-axis Number in front stretches or shrinks Number inside parenthesis moves left or right Number alone moves up or down	Describe the transformations: $f(x) = -\dfrac{1}{3}(x+2)^2 + 1$ - Reflect across x-axis - V shrink of $\frac{1}{3}$ - Left 2 - Up 1	Describe the transformations: $f(x) = (2)^{x-4} + 3$ - Right 4 - Up 3
		3. Describe the transformations made to f(x) to create the following functions. $g(x) = \dfrac{1}{4}(x-2)^2 + 5$ a= V shrink of $\frac{1}{4}$ h= Right 2 k= Up 5	4. Write the equation of a quadratic that has a vertex at (-5, -3), opens up, and is stretched by a factor of 2. $f(x) = 2(x+5)^2 - 3$
Intersections	**Graphically:** See where the two intersect and list as ordered pairs. **Algebraically:** Set the equations equal to each other and solve for x. Substitute each x back in and solve for y. List as ordered pairs.	11. $(0, -8)$ & $(3, -5)$	12. $y = x^2 - x - 6$ $y = 2x - 2$ $x^2 - x - 6 = 2x - 2$ $\underline{-2x+2 \quad -2x+2}$ $x^2 - 3x - 4 = 0$ $(x-4)(x+1) = 0$ $x-4=0 ; x+1=0$ $x = 4 ; x = -1$ $y = 2(4) - 2$ $y = 8 - 2$ $y = 6$ $\boxed{(4, 6)}$ $y = 2(-1) - 2$ $y = -2 - 2$ $y = -4$ $\boxed{(-1, -4)}$

Comparing Functions and Sequences	• Starting value= Function
	• Linear
	  $y = mx + b$
	• Exponential
	  $y = ab^x$
	
	• First Time = Sequence
		1. Taylor and Jordan are competing to see who can run the most during a week. On Day 1, Taylor runs 3 miles then increases his mileage each day by 4 miles. On Day 1, Jonathan runs ½ a mile and doubles his miles each day.
		
		Write the rule for the sequence that represents how many miles each runner will run in terms of days.
		
		Taylor: $a_n = 3 + 4(n-1) = 3 + 4_n - 4 = \boxed{4_n - 1}$
		
		Jordan: $\boxed{a_n = \frac{1}{2}(2)^{n-1}}$
		
		Who will reach 10 miles first? **Taylor**
		
		Taylor: $10 = 4_n - 1$
		$11 = 4_n$
		$2.75 = n$
		
		Jordan: Table → 5-6 days	

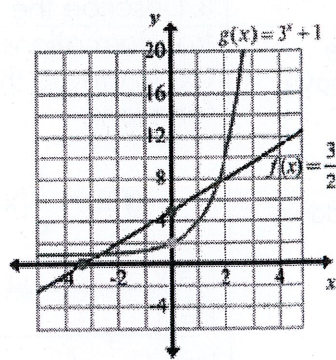|		
• Arithmetic: $a_n = a_1 + d(n-1)$ • Geometric: $a_n = a_1(r)^{n-1}$	2. Two companies are offering memberships for buying music. iTunes offers a $20 a month membership with a registration fee of $100. Amazon offers a $40 a month membership with a registration fee of $60. Write an equation for each company. iTunes: $y = 20x + 100$ Amazon: $y = 40x + 60$ Compare the rates of change and the y-intercepts. Amazon has a higher r.o.c. (40 > 20); but iTunes has a higher y-intercept (100 > 60) Which company is better if you only want 2 months? 12 months? 2 months: iTunes = $140 Amazon = $140 (tie) 12 months: iTunes = $340 Amazon = $540	

Characteristics of Functions

• Y-int (where it crosses the y-axis) • X-int (where it crosses the x-axis) • Rate of Change $m = \dfrac{y_2 - y_1}{x_2 - x_1}$	$g(x) = 3^x + 1$ $f(x) = \frac{3}{2}x + 5$

f(x)	<, >, or =	g(x)
ROC from x=0 to x=2 $\frac{3}{2}$	<	ROC from x=0 to x=2 $\frac{8}{2} = 4$
y-int $(0, 5)$	>	y-int $(0, 2)$
f(3) 9.5	<	g(3) 28

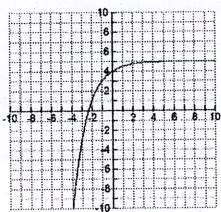**Determine whether a function is even, odd, or neither**
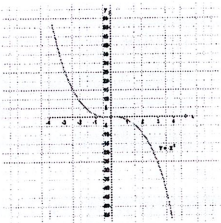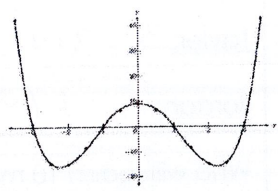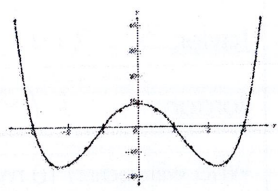
Graphically: • Even = Symmetric about the y-axis • Odd = 180 degree rotational symmetry + MUST go through origin (0,0) Algebraically: • Remember constants have x^0 – EVEN • Even = all exponents are even • Odd = all exponents are odd • Neither = mix of even and odd exponents	Determine whether the function is even, odd or neither. _N_ _O_ _E_	Determine whether the function is even odd or neither. $f(x) = 2x^3$ Odd $f(x) = -x^3 + x^1 + 5x^0$ Neither $f(x) = x^4 + 3x^1$ Neither $f(x) = x^2 - 9x^0$ Even