Acc. Geom/Algebra II | Name____________________________

Transformations of Rationals and others | Period ________Date ______________

I. As we've learned earlier, $y = x^2$ can be transformed into $f(x) = a \cdot (x - h)^2 + k$.

1. What effect does **a** have on the graph of $y = x^2$?
   Vertically stretches (or compresses if abs(a) < 1) the entire graph by a factor of a.
2. What effect does **h** have on the graph of $y = x^2$?
3. What effect does **k** have on the graph of $y = x^2$?

II. You also know what $y = x^3$ looks like now. So consider the graph $g(x) = a \cdot (x - h)^3 + k$.

1. What effect does **a** have on the graph of $y = x^3$?
2. What effect does **h** have on the graph of $y = x^3$?
3. What effect does **k** have on the graph of $y = x^3$?

III. The parent graph of a rational function is $y = \frac{1}{x}$. So consider $h(x) = k + \frac{a}{x - h}$.

1. What effect does **a** have on the graph of $y = \frac{1}{x}$?
2. What effect does **h** have on the graph of $y = \frac{1}{x}$?
3. What effect does **k** have on the graph of $y = \frac{1}{x}$?

IV. Look at all the cases above, and then describe the locations of the variables in relation to the parent graph.

1. Where is **a** located?

   What does **a** do?

   What happens when $a < 0$?

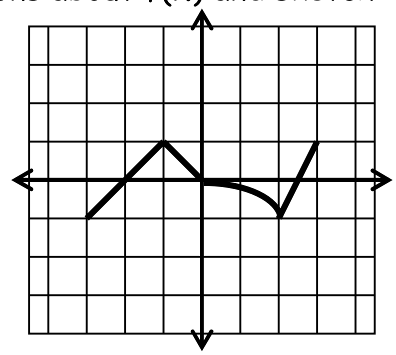
2. Where is **h** located?

   What does **h** do?

3. Where is **k** located?

   What does **k** do?

V. Consider the sketch of f(***x***) to the right. Answer questions about f(***x***) and sketch each of the following transformations of f(***x***).



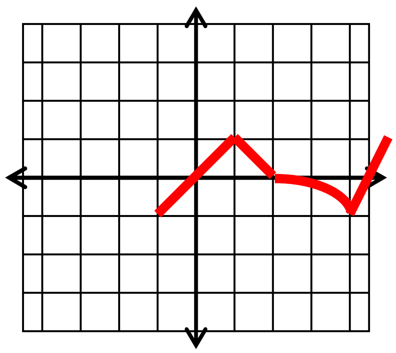
1. f(1) = -.25

2. f(2) = ______________

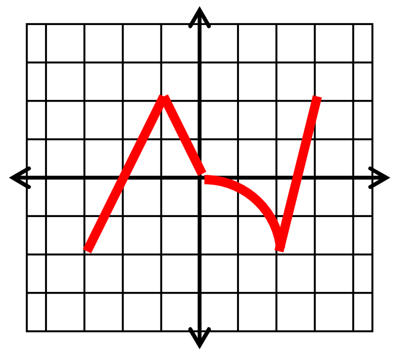
3. f(0) = ______________

4. f(–1) = ______________

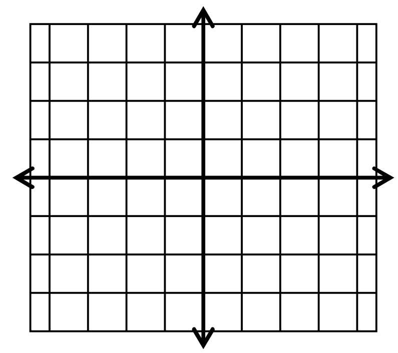
5. Sketch f(***x*** – 2)



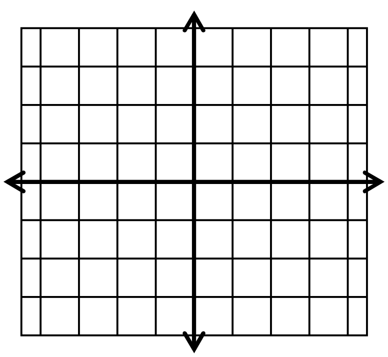
6. Sketch 2f(***x***)



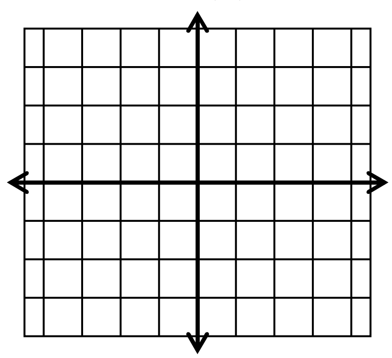
7. Sketch f(***x*** + 1) – 2



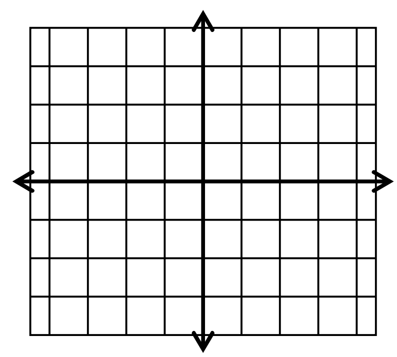
8. Sketch -f(***x***)



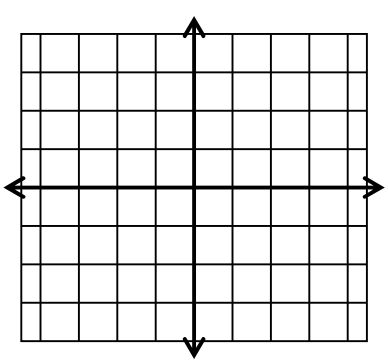
9. Sketch -f(***x***) + 2



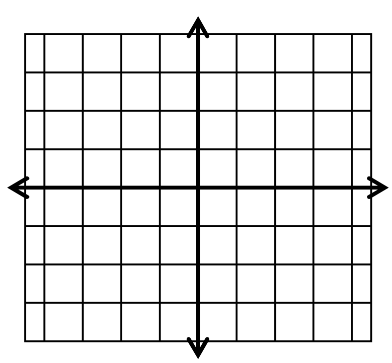
10. Sketch -f(***x*** + 2)



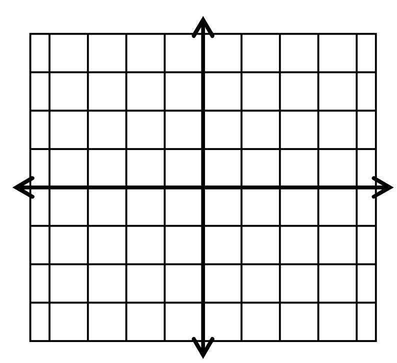
11. Sketch 3f(***x***)



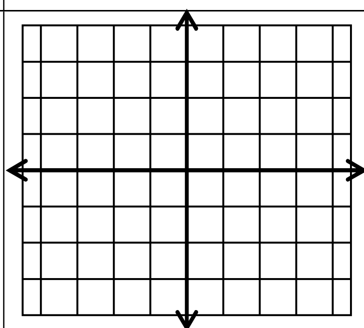
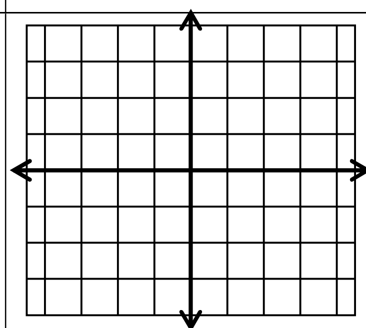
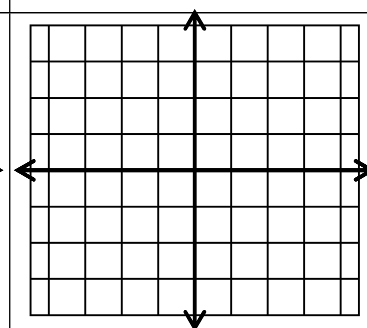
12. Sketch ($\frac{1}{2}$)f(***x***)



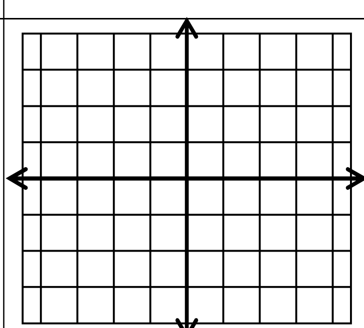
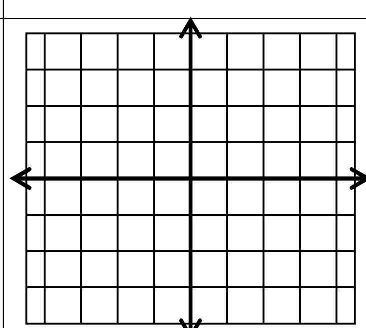
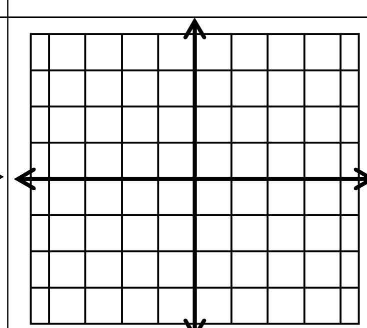
13. Sketch 1 + 3f(***x*** – 2)



VI. For each of the following: a) **Evaluate** f(2), b) Describe the **transformations** of $\boldsymbol{y} = 1/\boldsymbol{x}$ that have been done to this function, c) Use this information to **sketch** the graph, d) Find the **domain** of the function, e) Find the **range** of the function, and f) Write **equations** of all the **asymptotes**.

Problem:	$f(x) = \dfrac{2}{x-1}$	$g(x) = \dfrac{-3}{x} + 4$	$h(x) = \dfrac{1}{2(x+3)} - 1$
Evaluate at $\boldsymbol{x} = 2$	f(2) =	g(2) =	h(2) =
Transformations			
Sketch the graph			
Domain			
Range			
Asymptotes			

VII. For each of the following: a) **Evaluate** f(-3), b) **Divide** this rational function to write its **quotient** in transformation form, c) Describe the **transformations** of $\boldsymbol{y} = 1/\boldsymbol{x}$ that have been done to this function, d) Use this information to **sketch** the graph, e) Find the **domain** of the function, f) Find the **range** of the function, and g) Write **equations** of all the **asymptotes**.

Problem:	$f(x) = \dfrac{x-2}{x+1}$	$g(x) = \dfrac{3x+5}{x-2}$	$h(x) = \dfrac{x-4}{2x-5}$
Evaluate $\boldsymbol{x} = -3$	f(-3) =	g(-3) =	h(-3) =
Quotient	$1 - \dfrac{3}{x+1}$ or $-\dfrac{3}{x+1} + 1$		
Transformations			
Sketch the graph			
Domain			
Range			
Asymptotes			

VIII. REVIEW of what I've already mastered: Perform the indicated operations, and **simplify completely**.

A) $\dfrac{x+3}{x-7} \cdot \dfrac{x^2-6x-7}{x^2-9}$

B) $\dfrac{25x^2-100}{x^2-x-12} \div \dfrac{x^2-2x-24}{2x^2-72}$

C) $\dfrac{\dfrac{1}{x+2}}{1+\dfrac{1}{x+2}}$

D) $\dfrac{12+\dfrac{1}{x}-\dfrac{1}{x^2}}{4+\dfrac{1}{x}}$

E) $\dfrac{x}{x^2-x-12} + \dfrac{x-2}{x^2-16}$

F) $\dfrac{4}{x+6} - \dfrac{x+3}{x^2-36}$

G) $\dfrac{x+a}{x-a} - \dfrac{x^2-a^2}{ax-a^2}$

H) $\dfrac{3x+13}{x^2-3x-10} - \dfrac{16}{x^2-6x+5}$