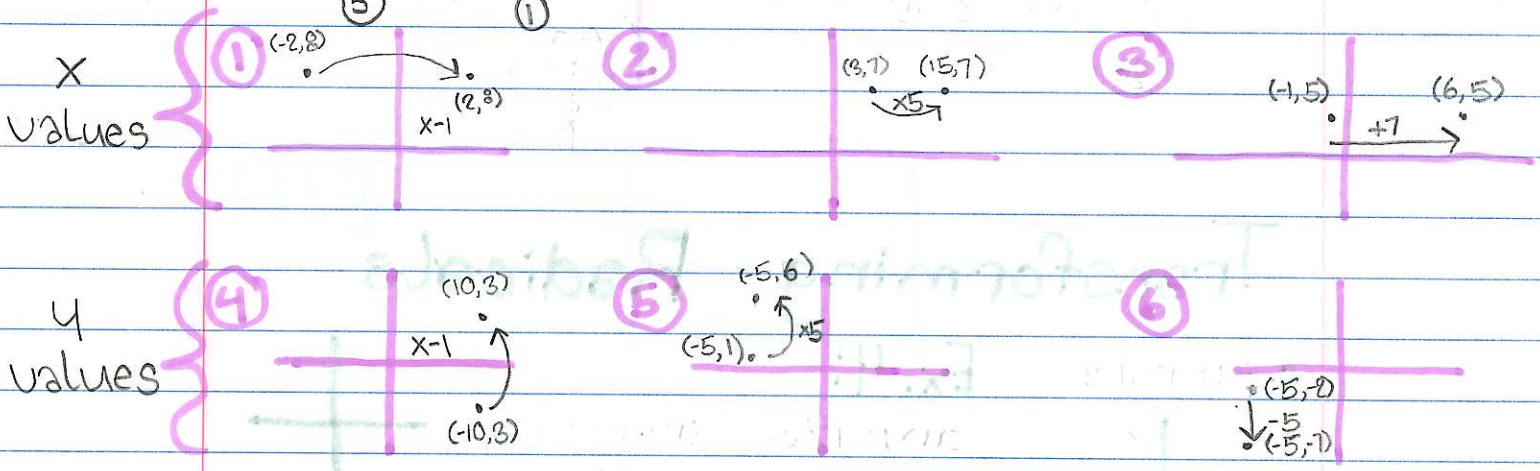
Transforming Coordinates

$$g(x) = \pm a f(\pm b(x-h)) + k$$

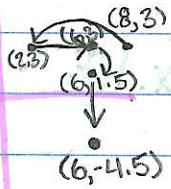
- $\pm a$: vertical reflection in the x-axis changes the sign on the y-coordinate (4); vertically scales/multiplies the y-coordinate (5)
- $\pm b$: horizontal reflection over the y-axis changes the sign on the x-coordinate (1); scales/multiplies the x-coordinate (2)
- h: horizontally translates the x-coordinate (3)
- k: vertical translation of the y-coordinate (6)



b is inversed

Example 1:

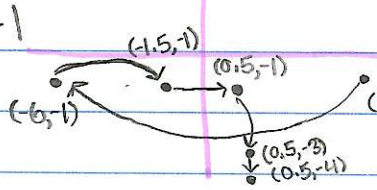
$g(x) = \frac{1}{2} f(4(x-4)) - 6$



- horizontal stretch $\times \frac{1}{4}$
- horizontal translation 4 right
- vertical stretch $\times \frac{1}{2}$
- vertical translation 6 down

Example 2:

$g(x) = 3f(-4(x-2)) - 1$

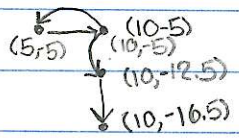


- horizontal reflection
- horizontal stretch $\times \frac{1}{4}$
- horizontal translation right 2
- Vertical stretch $\times 3$
- Vertical translation 1 down

Example 3:

$g(x) = \frac{5}{2} f(2x-10) - 4$

$g(x) = \frac{5}{2} f(2(x-5)) - 4$



- HS: $\times \frac{1}{2}$
- HT: 5 right
- VS: $\times 2.5$
- VT: 4 down

Hilroy