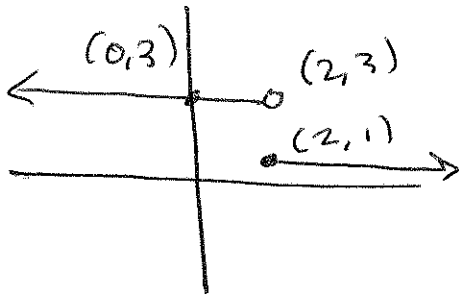


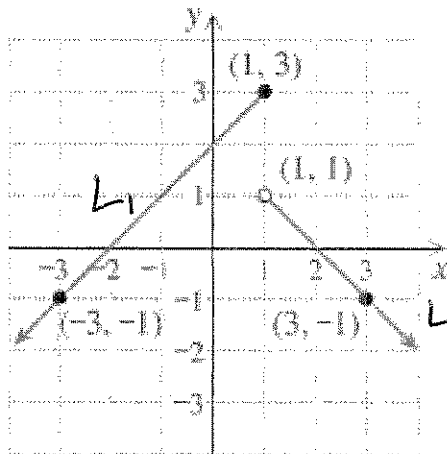
1. Sketch the graph of $f(x) = \begin{cases} 3 & \text{for } x < 2 \\ 1 & \text{for } x \geq 2 \end{cases}$. State its Domain and Range.



$D = (-\infty, \infty)$

$R = \{1, 3\}$

2. Write a piecewise function for the given graph.



$L_1: m = \frac{3 - (-1)}{1 - (-3)} = \frac{4}{4} = 1$

$y = 1(x - (-1)) - 3$

$y = x + 1 - 3 = x - 2$

$x \leq 1$

$L_2: m = \frac{-1 - 1}{3 - 1} = \frac{-2}{2} = -1$

$y = -1(x - 3) - 1$

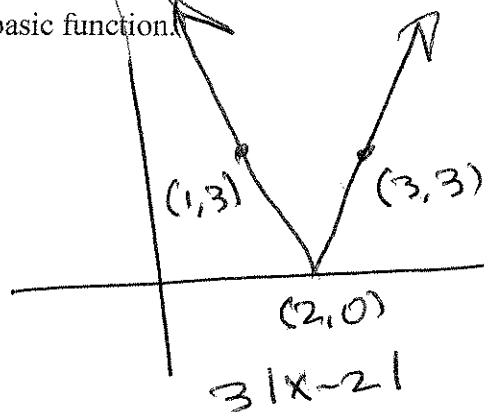
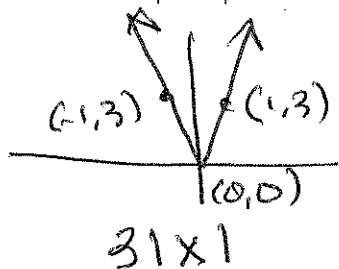
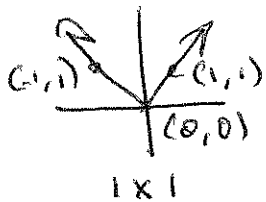
$= -x + 3 - 1$

$= -x + 2$

$x > 1$

$$f(x) = \begin{cases} x - 2 & \text{if } x \leq 1 \\ -x + 2 & \text{if } x > 1 \end{cases}$$

3. Sketch the graph of $y = 3|x - 2|$ by transforming a basic function.



4. Let $f = \{(-3,1), (0,4), (2,0)\}$ and $g = \{(-3,2), (1,2), (2,6)\}$. Find each function:

a. $f \circ g = \{(-3,0), (1,0)\}$

b. $g \circ f = \{(-3,2)\}$

5. Let $f(x) = 3x - 1$ and $h(x) = \frac{x+1}{3}$. Find $(h \circ f)(-7)$

$$h(f(-7)) = h(3(-7) - 1) = h(-22) = \frac{-22+1}{3} = -7$$

6. Let $f(x) = (x-2)^3$. Find functions $g(x)$ and $h(x)$ such that $f = h \circ g$

$$g(x) = x - 2, \quad h(x) = x^3$$

7. Find the inverse of $f(x) = -x^3 + 4$

$$-x^3 + 4 = y$$

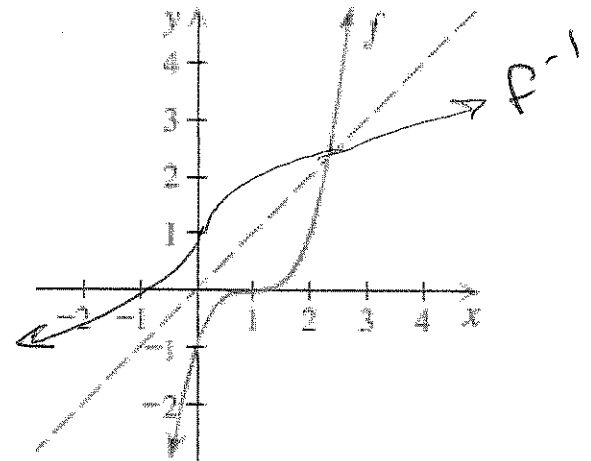
$$-y^3 + 4 = x$$

$$-y^3 = x - 4$$

$$y^3 = -x + 4$$

$$y = \sqrt[3]{-x + 4}$$

8. Given the sketch of f , sketch the graph of f^{-1} .



9. Bonus: PROVE that $f(x) = \frac{2x-1}{x-6}$ is 1-to-1. (Next quiz/test, I'm likely to ask you to find the inverse of something like this.)

$$\frac{2x_1-1}{x_1-6} = \frac{2x_2-1}{x_2-6}$$

$$(2x_1-1)(x_2-6) = (2x_2-1)(x_1-6)$$

$$2x_1x_2 - 12x_1 - x_2 + 6 = 2x_1x_2 - 12x_2 - x_1 + 6$$

$$-12x_1 - x_2 = -12x_2 - x_1$$

$$-11x_1 = -11x_2 \implies x_1 = x_2$$