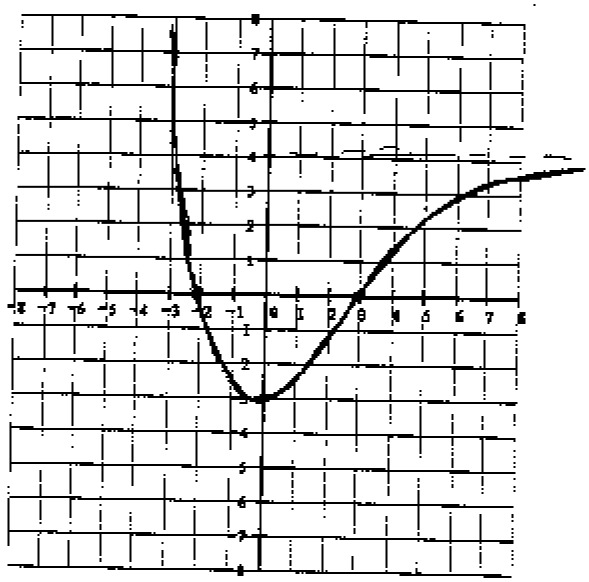
3.) (12 pts) (a) On the axes below, sketch a graph of a single *continuous* function, $y = f(x)$, which has *all* of the following features:

- $f(0) = -3$
- $f(-2) = 0$ and $f(3) = 0$
- f is decreasing for $x < 0$
- f is increasing for $x > 0$
- f is concave up for $x < 2$
- f is concave down for $x > 2$
- $f(x) \to 4$ as $x \to \infty$



(b) Is the function you drew in part (a) *invertible*? No
Explain why or why not.

The function does not pass the horizontal line test (or is not one-to-one -- or equivalent...).

4.) Data from three functions is shown in the table below. One function is linear, one is a power function, and one is neither of these.

x	-2	0	2	4	6	8	
$f(x)$	16.5	20	24.2	29.3	35.4	42.9	(neither)
$g(x)$	17.6	20	22.4	24.8	27.2	29.6	✓ - linear
$h(x)$	4.4	0	4.4	17.6	39.6	70.4	✓ power ...

(a) (6 pts) Determine a formula for the linear function. [Be certain to use the appropriate function name—*i.e.*, f, g, or h, from the table.]

g is linear $m = \frac{22.4-20}{2} = \frac{2.4}{2} = 1.2$

The y-intercept is $b = 20$ so

$g(x) = 20 + 1.2x$

(b) (6pts) Determine a formula for the power function. [Again use the correct function name.]

f can't be a power func. (since $f(0) = 20$)

Try h: $4.4 = k2^p$ & $17.6 = k4^p$, so

$4 = \frac{17.6}{4.4} = \frac{k4^p}{k2^p} = 2^p$

$2^p = 4 \to p = 2$; then $4.4 = k(2)^2$

so, $k = 1.1$

$h(x) = 1.1x^2$