LECTURE NOTES: §1.3

1. Explain what each does to the *original* graph $y = f(x)$. (Assume $c > 0$.)

   (a) $f(x) + c$

   (b) $f(x) - c$

   (c) $f(x + c)$

   (d) $f(x - c)$

   (e) $cf(x)$

   (f) $f(cx)$

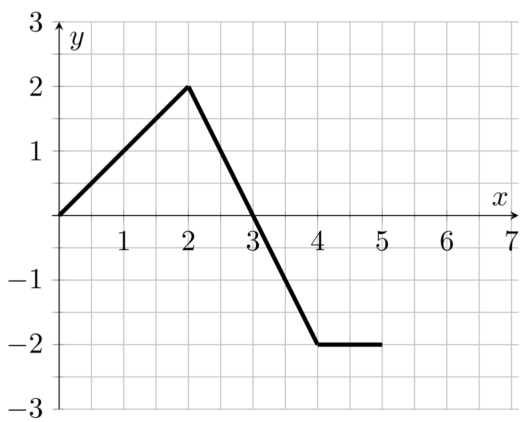
   (g) $-f(x)$

   (h) $f(-x)$

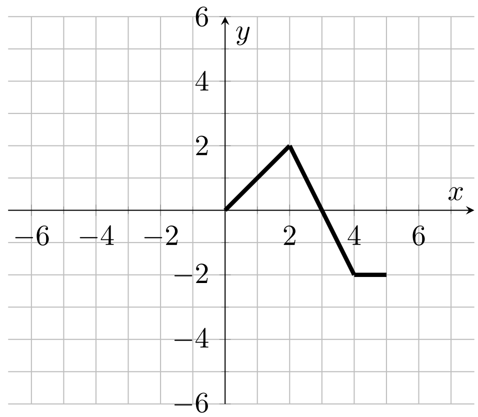
2. Let $f(x) = \begin{cases} 1 & x \leq 1 \\ 2 - x & x > 1 \end{cases}$. Graph each of the following *using the ideas from # 1 above.*

   (a) $f(x)$
   (b) $f(x + 1)$
   (c) $f(2x)$
   (d) $-3f(x)$

3. Given $g(x)$, graph the transformations of g.



(a) $-g(x)+1$



(b) $3g(-x)$

4. For $f(x) = 1/x$ and $g(x) = \sin x$, find

(a) $f + g$

(b) $2f - g$

(c) $f \circ g$

(d) $g \circ f$

(e) $g \circ g$

(f) $f \circ f$ and find its domain.

5. Given $H(x) = \frac{\sqrt{x}}{1-\sqrt{x}}$, find f and g such that $f \circ g = H$.

6. Graph each of the following using transformations.

   (a) $f(x) = 2\sin x$ on $[-\pi, 3\pi]$

   (b) $f(x) = \cos(x/3)$ (include at least one full cycle)

   (c) $f(x) = \tan(x - \pi/2)$ (include at least two full cycles)

(d) $f(x) = -\sqrt{x+2}$

(e) $f(x) = \frac{2}{(x-5)^2}$

(f) $f(x) = e^x,\ g(x) = e^{x-2},\ h(x) = e^x - 1$