# LECTURE NOTES: §1.3

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

   (a) $f(x) + c$ up c units

   (b) $f(x) - c$ down c

   (c) $f(x + c)$ left c

   (d) $f(x - c)$ right c

   (e) $cf(x)$ vertical stetch/shrink

   (f) $f(cx)$ horizontal stretch/shrink

   (g) $-f(x)$ reflect about x-axis

   (h) $f(-x)$ reflect about y-axis

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.*

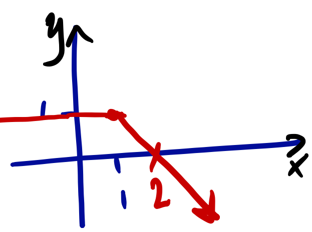
   (a) $f(x)$

   (b) $f(x + 1)$

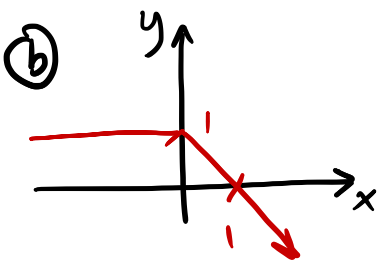
   (c) $f(2x)$

   (d) $-3f(x)$

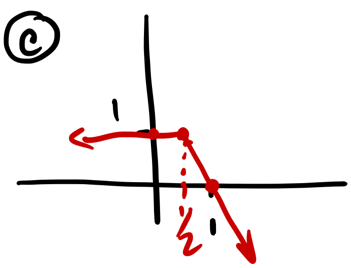
a



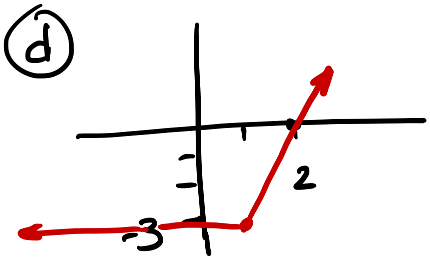

b




c

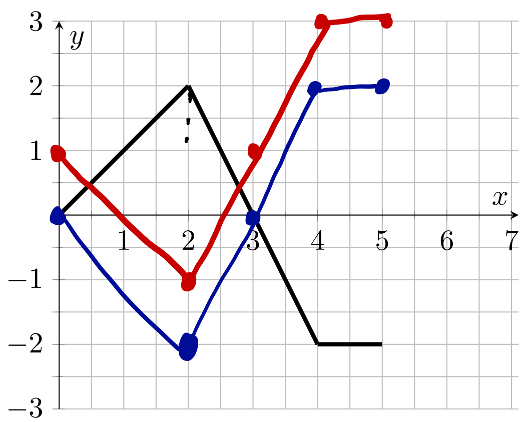


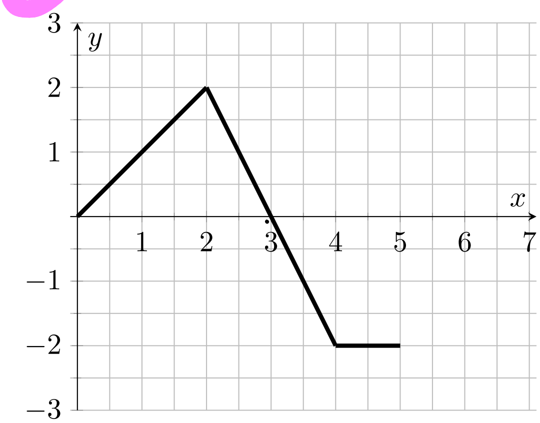

d



fix graph

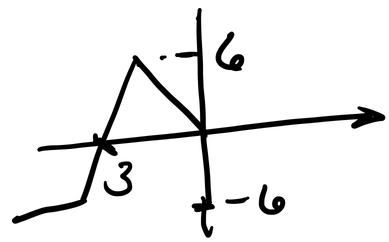
3. Given $g(x)$, graph the transformations of $g$.




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

(b) $3g(-x)$




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

(a) $f \circ g$ $= \frac{1}{\sin x}$

(b) $g \circ f$ $= \sin(1/x)$

(c) $g \circ g$ $= \sin(\sin x)$

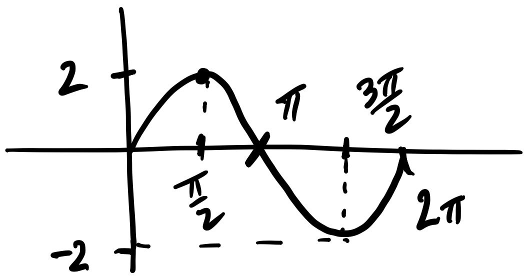
(d) $f \circ f$ and find its domain. $= \frac{1}{\frac{1}{x}}$ ; $(-\infty, 0) \cup (0, \infty)$

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

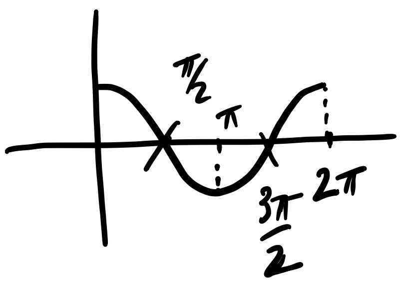
$g(x) = \sqrt{x}$, $f(x) = \frac{x}{1-x}$

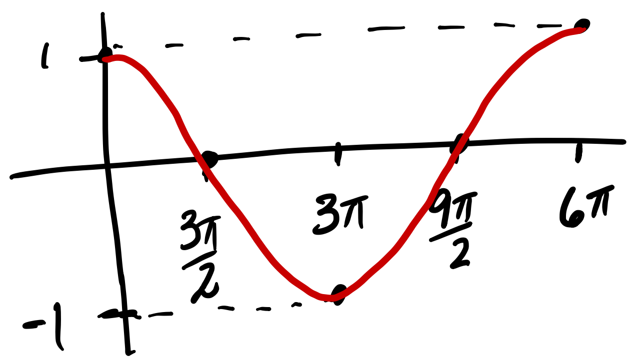
6. Graph each of the following using transformations.

(a) $f(x) = 2\sin x$ on $[0, 2\pi]$

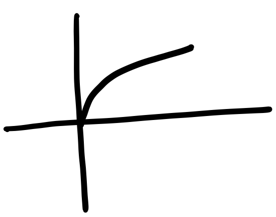


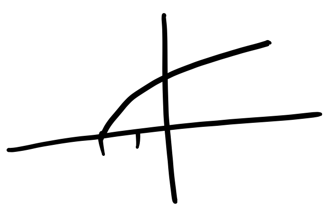

(b) $f(x) = \cos(x/3)$

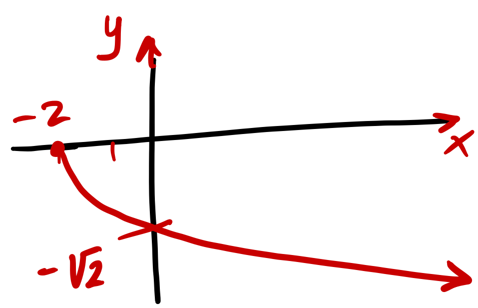


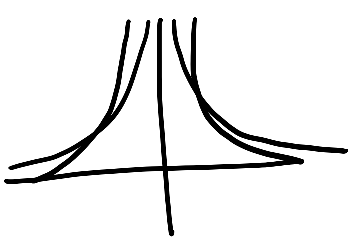

(c) $f(x) = -\sqrt{x+2}$

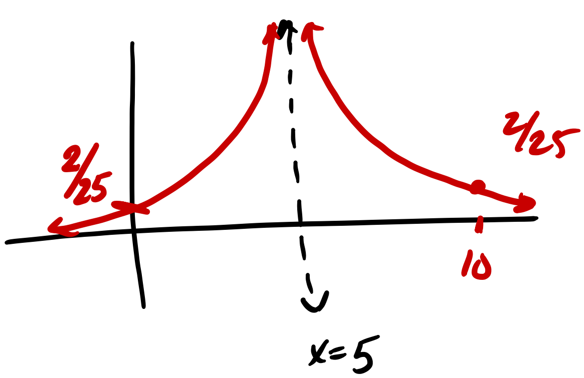







(d) $f(x) = \frac{2}{(x-5)^2}$





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