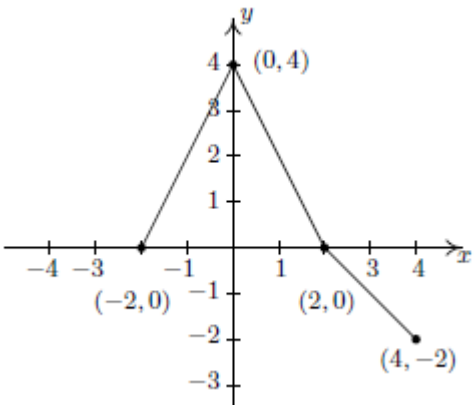
Worksheet 3 – Graphs and Transformations (§3.4)

1. Sketch the graph of the following functions using transformations. For partial credit, start with the basic graph of each function and graph/label each stage of its transformation. Use Desmos to check your final answer.

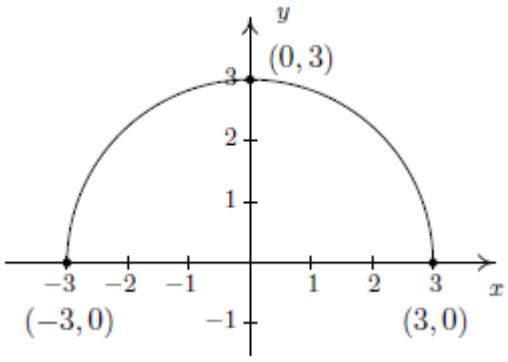
(a) $f(x) = (x+2)^3 - 1$
(b) $f(x) = 3 - \sqrt{x+1}$
(c) $f(x) = -(x-2)^2 + 3$
(d) $f(x) = 2\sqrt{x-3}$
(e) $f(x) = \frac{1}{2}\sqrt{x-3}$
(f) $f(x) = \sqrt{2x-6}$
(g) $f(x) = 2 - |x-3|$
(h) $f(x) = 2 + \sqrt[3]{3-x}$
(i) $f(x) = \frac{1}{x+2} - 1$
(j) $f(x) = \frac{1}{(x-1)^2} + 2$

2. Use the graph of $y = f(x)$ below to graph the given transformed function.

(a) $y = f(x) - 1$
(b) $y = f(x+1)$
(c) $y = \frac{1}{2}f(x)$
(d) $y = f(2x)$
(e) $y = -f(x)$
(f) $y = f(-x)$
(g) $y = f(x+1) - 1$
(h) $y = 1 - f(x)$



$y = f(x)$



$y = g(x)$

3. Use the graph of $y = g(x)$ above to graph the given transformed function.

(a) $y = g(x) + 3$
(b) $y = g(x) - \frac{1}{2}$
(c) $y = g\left(x - \frac{2}{3}\right)$
(d) $y = g(x+4)$
(e) $y = g(x+1) - 1$
(f) $y = \frac{3}{5}g(x)$
(g) $y = -2g(x)$
(h) $y = g\left(\frac{2}{3}x\right)$
(i) $y = -\frac{1}{4}g(3x)$
(j) $y = 4g(x-3) - 6$
(k) $y = 4 + g(1-2x)$
(l) $y = -\frac{1}{2}g\left(\frac{x+4}{2}\right) - 3$