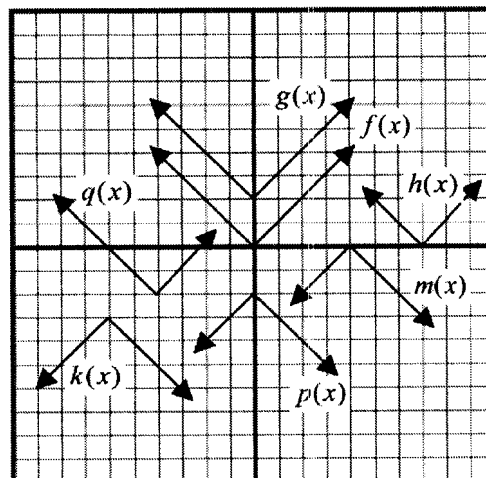


Transformations of Functions

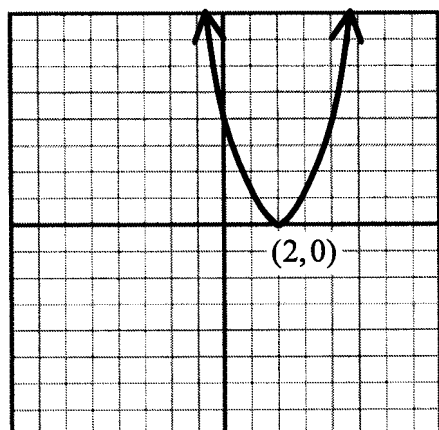
1. Describe the transformation that occurs and express each function graphed at the right in terms of $f(x)$.

- a) $g(x) = f(x) + 2$ 1. shift up 2
- b) $h(x) = f(x - 7)$ 1. shift right 7
- c) $m(x) = -f(x - 4)$ 1. shift right 4, 2. reflect across x-axis
- d) $p(x) = -f(x) - 2$ 1. reflect across x-axis, 2. shift down 2
- e) $q(x) = f(x + 4) - 2$ 1. shift left 4, 2. shift down 2
- f) $k(x) = -f(x + 6) - 3$ 1. shift left 6, 2. reflect across x-axis, 3. shift down 3

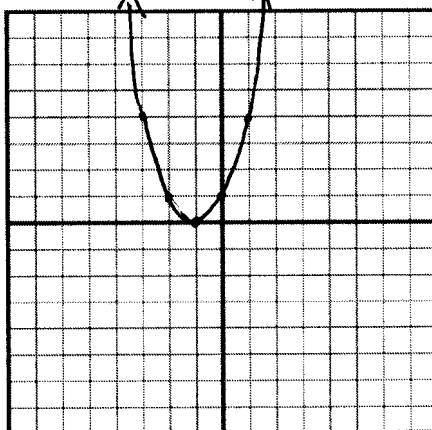


2. Sketch a graph of each function based on the graph of $f(x)$

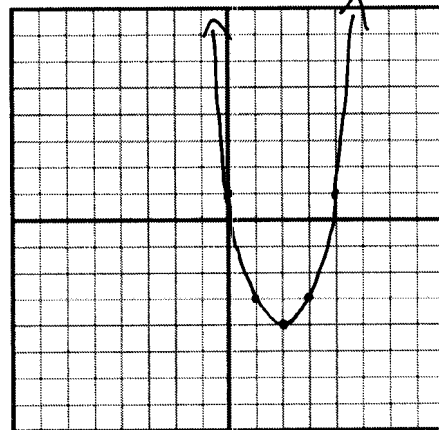
$f(x)$:



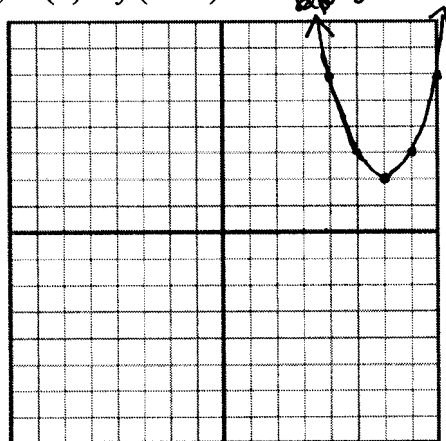
a) $g(x) = f(x + 3)$ left 3



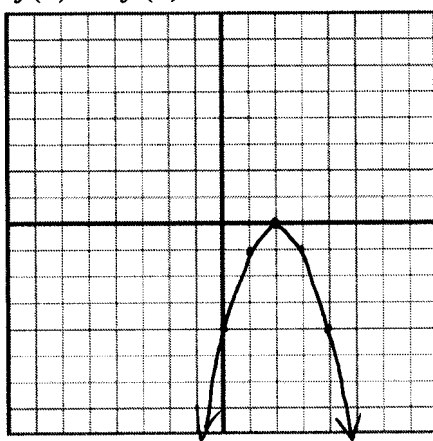
b) $h(x) = f(x) - 4$ down 4



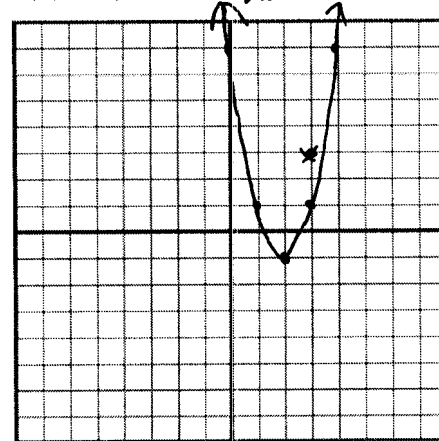
c) $m(x) = f(x - 4) + 2$ Right 4, up 2



d) $j(x) = -f(x)$ reflect x-axis

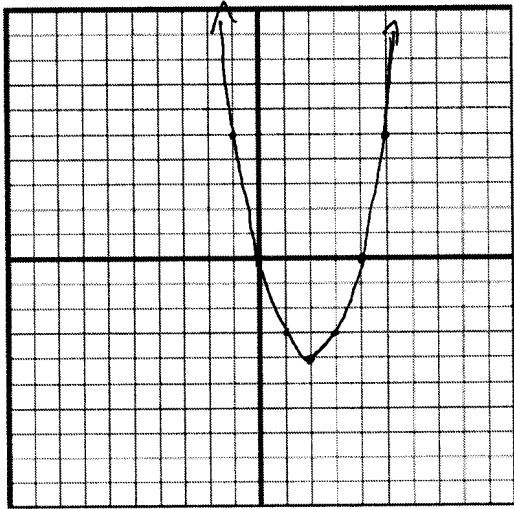


e) $k(x) = 2f(x) - 1$ vert stretch of 2, down 1

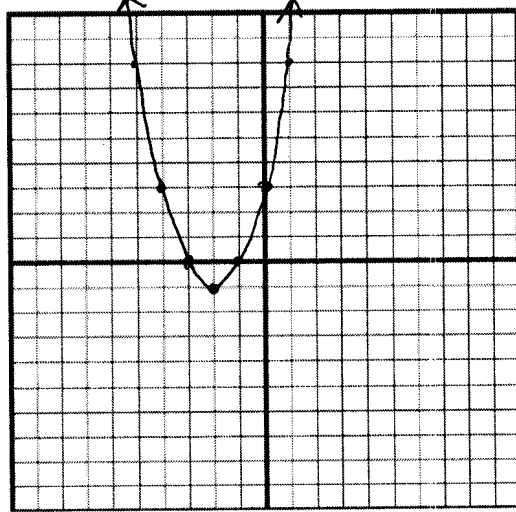


3. Graph the following and describe the transformation of each graph from the parent function.

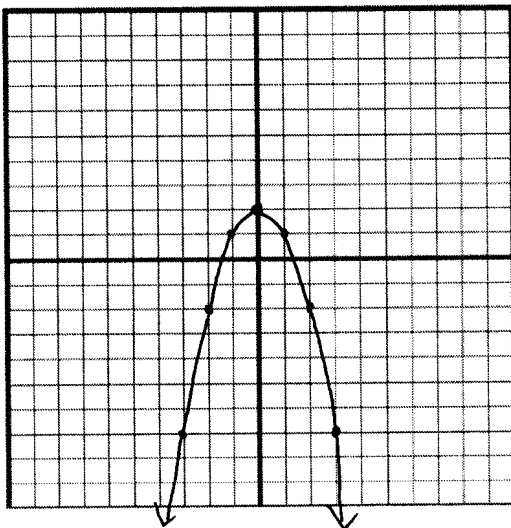
a) $y = (x-2)^2 - 4$ shift right 2, shift down 4



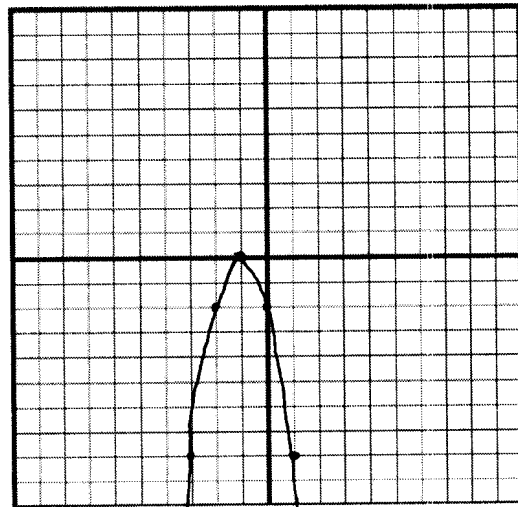
b) $y = (x+2)^2 - 1$ shift left 2, shift down 1



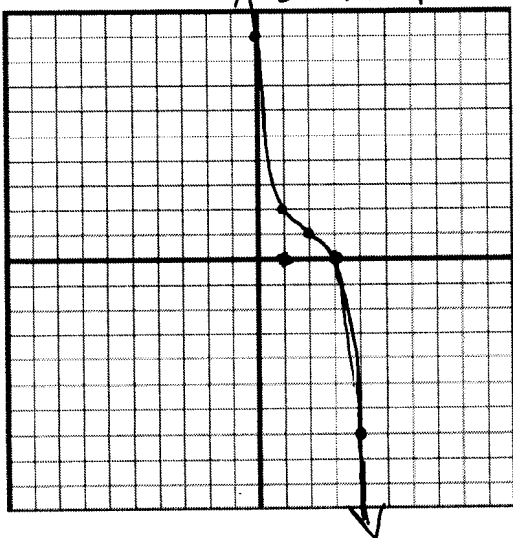
c) $y = -x^2 + 2$ reflect x-axis, shift up 2



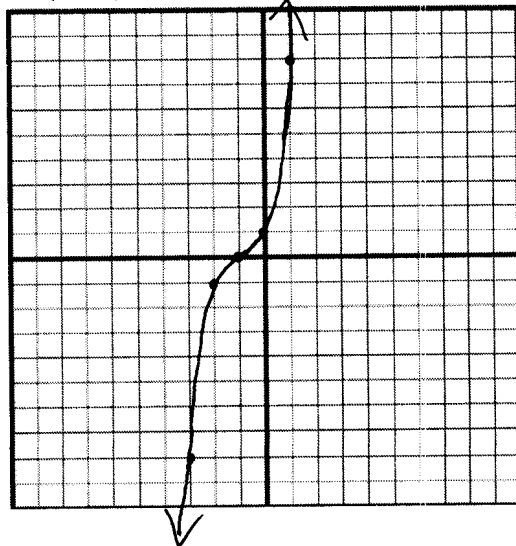
d) $y = -2(x+1)^2$ shift left 1, stretch vertically 2, reflect x-axis



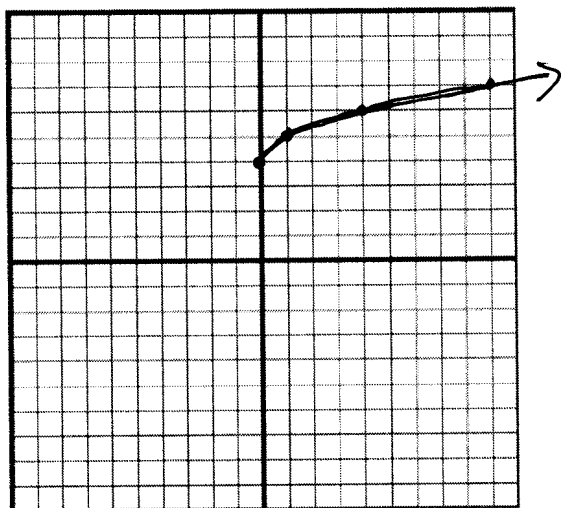
e) $y = -(x-2)^3 + 1$ shift right 2, reflect x-axis, shift up 1



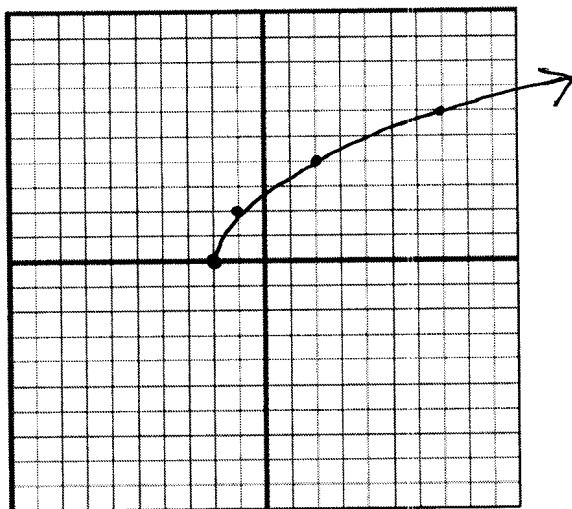
f) $y = (x+1)^3$ shift left 1



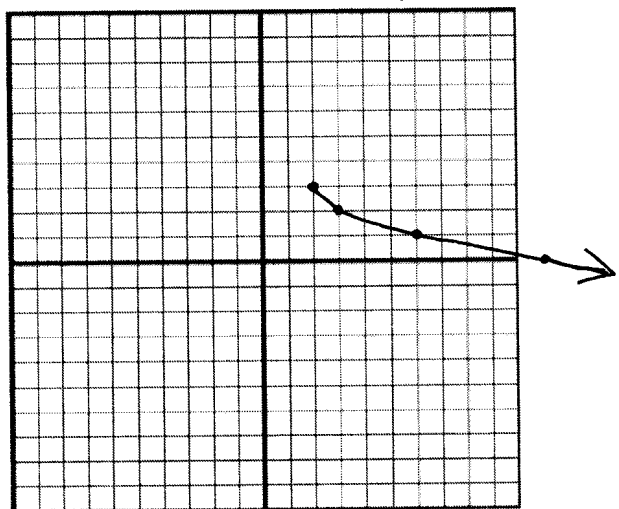
g) $y = \sqrt{x+4}$ shift up 4



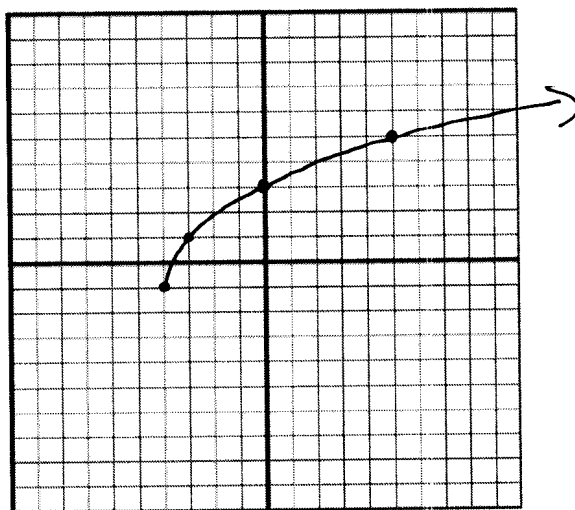
h) $y = 2\sqrt{x+2}$ shift left 2, stretch vertically by 2



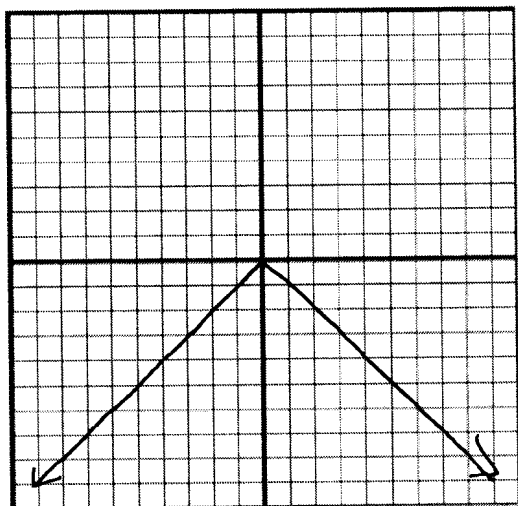
i) $y = -\sqrt{x-2}+3$ shift right 2, reflect x-axis, shift up 3



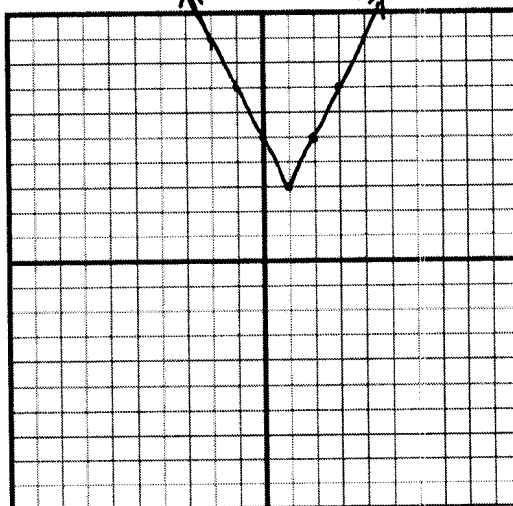
j) $y = 2\sqrt{x+4}-1$ shift left 4, stretch vertically by 2, shift down 1



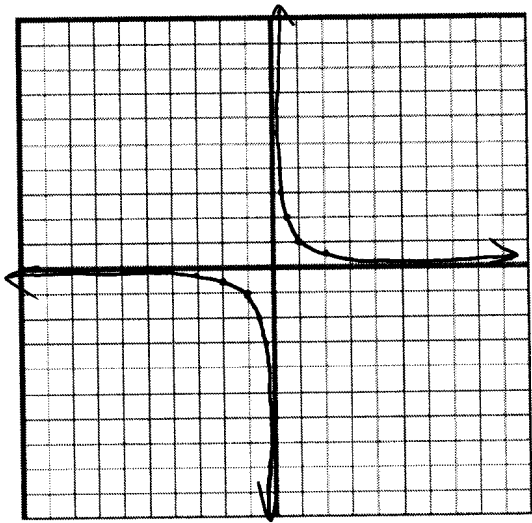
k) $y = -|x|$ reflect x-axis



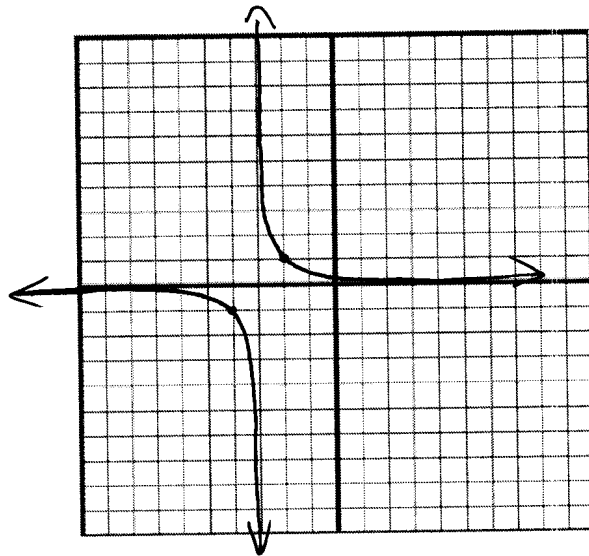
l) $y = 2|x-1|+3$ shift right 1, stretch vertically by 2, shift up 3



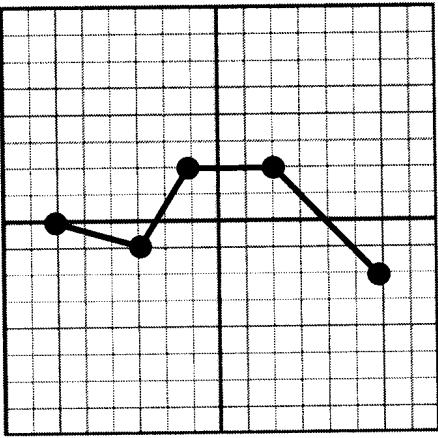
m) $y = \frac{1}{x}$



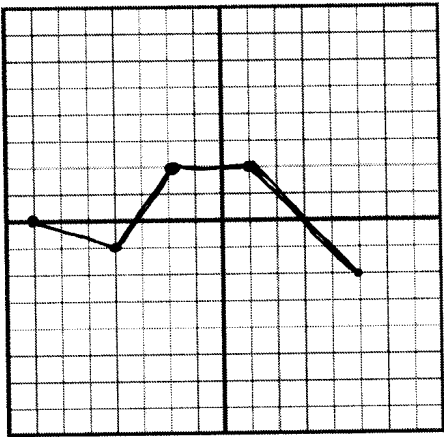
n) $y = \frac{1}{x+3}$ *shift left 3*



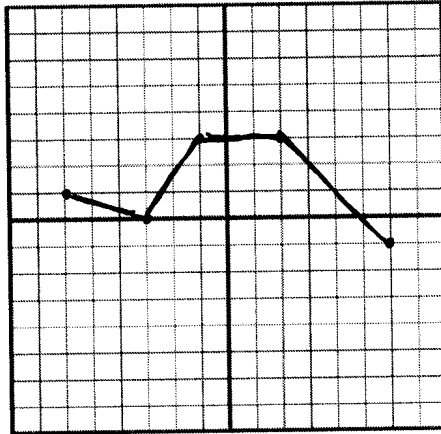
4.



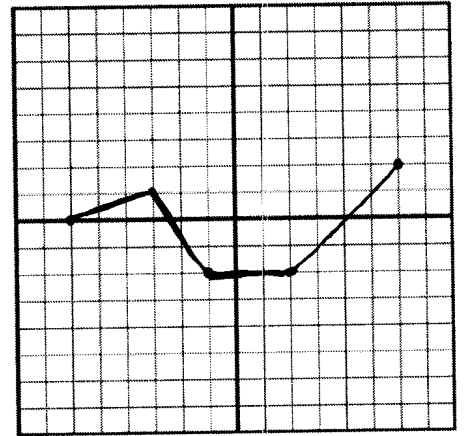
b) $f(x+1)$ shift left 1



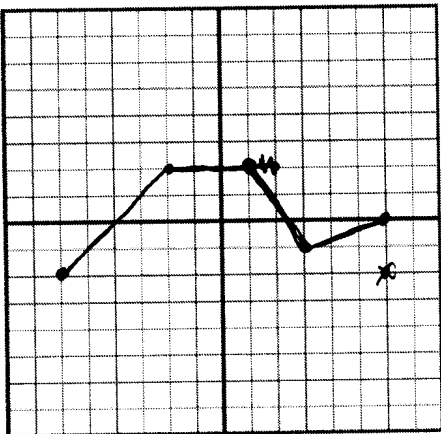
c) $f(x)+1$ shift up 1



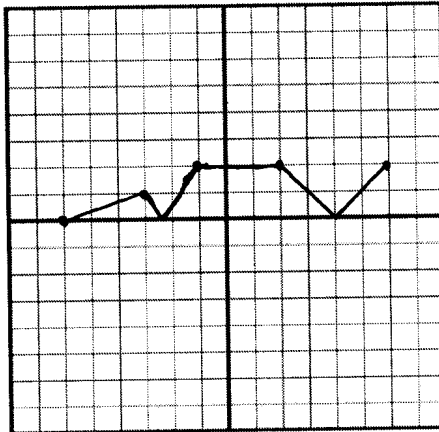
d) $-f(x)$ reflect x-axis



e) $f(-x)$ reflect y-axis



f) $|f(x)|$ negative y-values reflect across x-axis



g) $f(|x|)$ ~~negative~~ negative x-values have y-value of positive corresponding x

