<u>Worksheet 5 KEY – Inverse Functions (§3.7)</u>
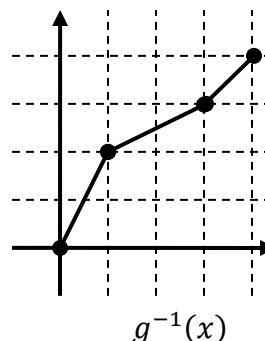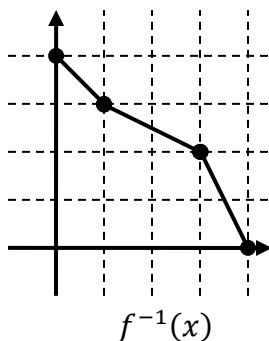
1.

  (a) $f^{-1}(3) = 1$ **(c)** $g^{-1}(2) = 3$ **(e)** $(f^{-1} \circ g^{-1})(-4) = 3$
  (b) $f^{-1}(4) = -3$ **(d)** $g^{-1}(0) = -2$ **(f)** $(g^{-1} \circ f^{-1})(1) = -2$

2.

  (a) $f^{-1}(3) = 2$ **(c)** $g^{-1}(1) = 2$ **(e)** $(f^{-1} \circ g^{-1})(0) = 4$
  (b) $f^{-1}(4) = 0$ **(d)** $g^{-1}(4) = 4$ **(f)** $(g^{-1} \circ f^{-1})(1) = 3$

3.

$$f^{-1}(x) \qquad\qquad\qquad g^{-1}(x)$$

4.

  (a) Not invertible because $f(2) = f(-3)$, but $2 \neq -3$.
  (b) Is invertible because no 2$^{\text{nd}}$ coordinate is repeated. $f^{-1} =$
   $\{(-3,1), (4,-3), (-1,0), (2,2)\}$
  (c) Is invertible by the horizontal line test. $f^{-1}(x) = (x+4)^3$
  (d) Not invertible because $f(2) = f(-2)$, but $2 \neq -2$.
  (e) Is invertible because $f(a) = f(b) \Rightarrow \frac{a}{1-2a} = \frac{b}{1-2b} \Rightarrow a - 2ab = b - 2ab \Rightarrow a =$
   $b. \ f^{-1}(x) = \frac{x}{1-2x}$
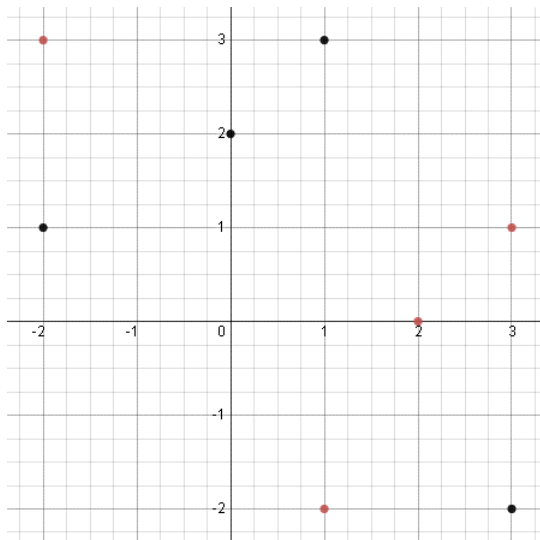 **(f)** Not invertible because $f(-1) = f(1)$, but $-1 \neq 1$.

5. Good luck.

6.

  (g) $f^{-1} = \{(-2,3), (3,1), (2,0), (1,-2)\}$ **(c)** $f^{-1}(x) = x^3 + 2$
  (h) $f^{-1}(x) = -\frac{1}{2}x + \frac{3}{2}$ **(d)** $f^{-1}(x) = x^2 - 2, \ x \geq 0$
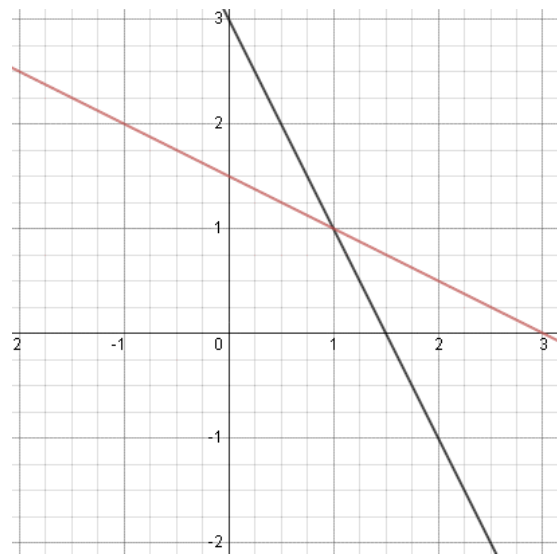
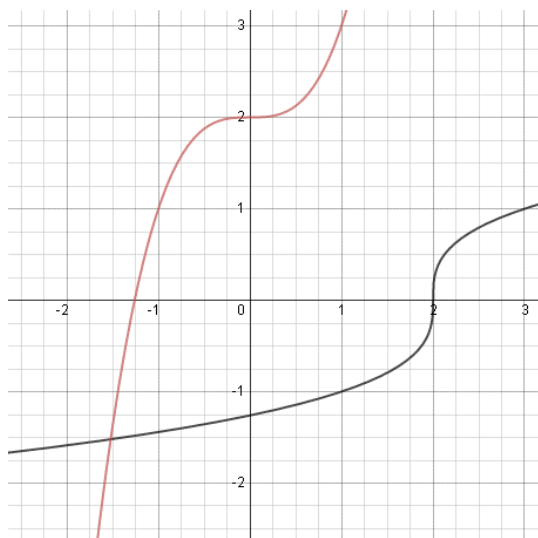 Graphs are on next page.

7. "symmetric across the line $y = x$."

(a)

(b)

(c)

(d)