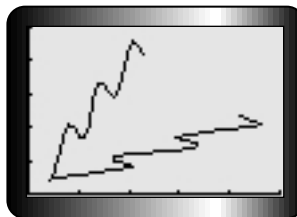


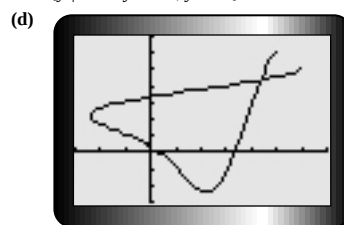
Practice 3.5, page 264

1. (a) $f^{-1}(x) = \pm \sqrt{\frac{x-3}{-2}} - 1$
 $D = \mathbf{R}, R = \{y \mid y \leq 3, y \in \mathbf{R}\}; D = \{x \mid x \leq 3, x \in \mathbf{R}\},$
 $R = \mathbf{R};$ no: fails vertical line test
- (b) $f^{-1}g(x) = x^2, x \geq 0$
 $D = \{x \mid x \geq 0, x \in \mathbf{R}\}, R = \{y \mid y \geq 0, y \in \mathbf{R}\};$
 $D = \{x \mid x \geq 0, x \in \mathbf{R}\}, R = \{y \mid y \geq 0, y \in \mathbf{R}\};$ function:
 passes vertical line test
- (c) $f^{-1}(x) = x^2 + 2$
 $D = \{x \mid x \geq 2, x \in \mathbf{R}\}, R = \{y \mid y \geq 0, y \in \mathbf{R}\};$
 $D = \{x \mid x \geq 0, x \in \mathbf{R}\}, R = \{y \mid y \geq 2, y \in \mathbf{R}\};$ function:
 passes vertical line test
- (d) $y^{-1}(x) = x^{\frac{1}{3}}$
 $D = \mathbf{R}, R = \mathbf{R};$ for inverse, $D = \mathbf{R}, R = \mathbf{R};$ function:
 passes vertical line test
- (e) $g^{-1}(x) = \frac{1}{x}$
 $D = \{x \mid x \neq 0, x \in \mathbf{R}\}, R = \{y \mid y \neq 0, y \in \mathbf{R}\};$
 $D = \{x \mid x \neq 0, x \in \mathbf{R}\}, R = \{y \mid y \neq 0, y \in \mathbf{R}\};$ function:
 every value of x corresponds to a unique value of y
- (f) $f^{-1}(x) = 3 - \frac{1}{x}$
 $D = \{x \mid x \neq 3, x \in \mathbf{R}\}, R = \{y \mid y \neq 0, y \in \mathbf{R}\};$
 $D = \{x \mid x \neq 0, x \in \mathbf{R}\}, R = \{y \mid y \neq 3, y \in \mathbf{R}\};$ function:
 passes vertical line test
- (g) $y^{-1}(x) = \frac{1}{x^2} + 2$
 $D = \{x \mid x > 2, x \in \mathbf{R}\}, R = \{y \mid y > 0, y \in \mathbf{R}\};$
 $D = \{x \mid x > 0, x \in \mathbf{R}\}, R = \{y \mid y > 2, y \in \mathbf{R}\};$ function:
 passes vertical line test
- (h) $f^{-1}(x) = \sqrt{9 - x^2} + 2$
 $D = \{x \mid -1 \leq x \leq 5, x \in \mathbf{R}\},$
 $R = \{y \mid 0 \leq y \leq 3, y \in \mathbf{R}\}; D = \{x \mid 0 \leq x \leq 3, x \in \mathbf{R}\},$
 $R = \{y \mid -1 \leq y \leq 5, y \in \mathbf{R}\};$ not a function: fails vertical
 line test
- (i) $g^{-1}(x) = \frac{1}{3} \sin^{-1} x$
 $D = \mathbf{R}, R = \{y \mid -1 \leq y \leq 1, y \in \mathbf{R}\};$
 $D = \{x \mid -1 \leq y \leq 1, x \in \mathbf{R}\}, R = \mathbf{R};$
 not a function: fails vertical line test
- (j) $f^{-1}(x) = \frac{1}{3} \cos^{-1}(x - 1)$
 $D = \mathbf{R}, R = \{0 \leq y \leq 2, y \in \mathbf{R}\}; D = \{x \mid 0 \leq x \leq 2, x \in \mathbf{R}\},$
 $R = \mathbf{R};$ not a function: fails vertical line test

2. ii. $f^{-1}(x) = \sqrt{\frac{x+2}{3}} + 1$
- iii. for $f: D = \{x \mid -0.3 \leq x \leq 2, x \in \mathbf{R}\},$
 $R = \{y \mid -2 \leq y \leq 3.07, y \in \mathbf{R}\};$ for $f^{-1}: D = \{x \mid -2 \leq x \leq 3.07, x \in \mathbf{R}\},$
 $R = \{y \mid -0.3 \leq y \leq 2, y \in \mathbf{R}\}$
- iv. (a) $f^{-1}(x) = 3 - \frac{1}{x}$
 for $f: D = \{x \mid -1 \leq x \leq 2, x \in \mathbf{R}\},$
 $R = \{y \mid 0.25 \leq y \leq 1, y \in \mathbf{R}\};$ for
 $f^{-1}: \{x \mid 0.25 \leq x \leq 1, x \in \mathbf{R}\}, R = \{y \mid -1 \leq y \leq 2, y \in \mathbf{R}\}$
 (b) $g^{-1}(x) = \sqrt{9 - x^2} + 2$
 for $g: D = \{x \mid -1 \leq x \leq 2, x \in \mathbf{R}\},$
 $R = \{y \mid 0 \leq y \leq 3, y \in \mathbf{R}\};$ for $g^{-1}: D = \{x \mid 0 \leq x \leq 3, x \in \mathbf{R}\}, R = \{y \mid -1 \leq y \leq 2, y \in \mathbf{R}\}$
- (c)



for $y: D = \{x \in \mathbf{R} \mid 0.4 \leq x \leq 2.3\},$
 $R = \{y \mid 0.4019 < y < 4.625, y \in \mathbf{R}\};$ for $y^{-1}: D = \{x \mid 0.4019 < x < 4.625, x \in \mathbf{R}\},$
 $R = \{y \mid 0.4 \leq y \leq 2.3, y \in \mathbf{R}\}$



(d)
 for $f: D = \{x \mid 0 \leq x \leq 5, x \in \mathbf{R}\},$
 $R = \{y \mid -2.4006 < y < 5.976\,99, y \in \mathbf{R}\};$ for $f^{-1}: D = \{x \mid -2.4006 < x < 5.976\,99, x \in \mathbf{R}\},$
 $R = \{y \mid 0 \leq y \leq 5, y \in \mathbf{R}\}$