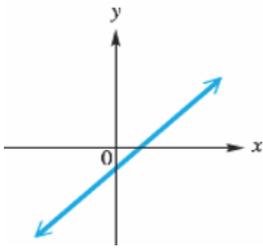


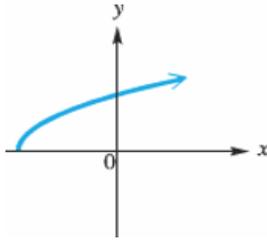
4.1 In-class Practice

1. Decide whether each function is one-to-one.

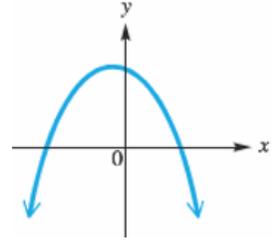
a)



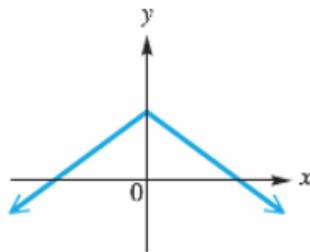
b)



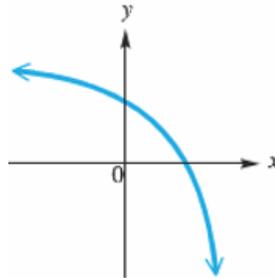
c)



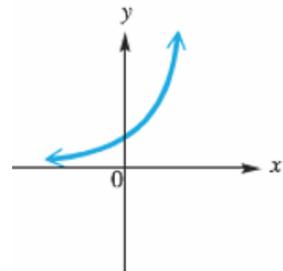
d)



e)



f)



g) $y = 4x - 20$

h) $y = \sqrt{36 - x^2}$

i) $y = 2x^3 - 1$

j) $y = 4x^2 - 20$

k) $y = \frac{-1}{x+2}$

l) $y = -3(x - 2)^2 + 8$

m) $y = |4x - 20|$

n) $y = \sqrt[3]{x + 1} - 3$

o) $y = \frac{-2}{x^2+1}$

Concept Check:

2. a) For the function to have an inverse, it must be _____ .

b) If functions f and g are inverses of each other, then $(f \circ g)(x) = \underline{\hspace{2cm}}$, and $\underline{\hspace{2cm}} = x$.

c) The domain of f is equal to the _____ of f^{-1} , and the range of f is equal to the _____ of f^{-1} .

d) If the point (a, b) lies on the graph of f , and f has an inverse, then the point _____ lies on the graph of f^{-1} .

e) *True or false:* If $f(x) = x^2$, then $f^{-1}(x) = \sqrt{x}$.

f) If a function f has an inverse, then the graph of f^{-1} can be obtained by reflecting the graph of f across the line _____ .

g) If a function f has an inverse and $f(-3) = 6$, then $f^{-1}(6) = \underline{\hspace{2cm}}$.

h) If $f(-4) = 16$ and $f(4) = 16$, then f (does/does not?) have an inverse because _____ .

3. Use the definition of inverse function to determine if f and g are inverses of each other.

a) $f(x) = 3x + 9$, $g(x) = \frac{1}{3}x - 3$

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

c) $f(x) = \frac{2}{x+6}$, $g(x) = \frac{6x+2}{x}$

d) $f(x) = x^2 + 3$, $x \geq 0$; $g(x) = \sqrt{x-3}$, $x \geq 3$

4.1 In-class Practice

3. Assume that f is one-to-one function.

a) If $f(2) = 7$, find $f^{-1}(7)$.

b) If $f^{-1}(3) = -1$, find $f(-1)$.

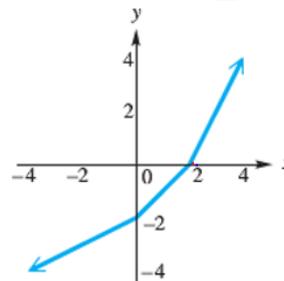
4. a) If $f(x) = 5 - 2x$, find $f^{-1}(3)$

b) If $g(x) = x^2 + 4x$ with $x \geq -2$, find $g^{-1}(5)$.

5. Use the given graph to find each value.

a) $f^{-1}(4)$ b) $f^{-1}(2)$ c) $f^{-1}(0)$

d) $f^{-1}(-2)$ e) $f^{-1}(-3)$ f) $f^{-1}(-4)$



6. For each function, if it is one-to-one,

- find its inverse in the form $y = f^{-1}(x)$;
- graph f and f^{-1} on the same grid;
- give the domain and range of f and f^{-1}

a) $f(x) = -2x - 3$

b) $f(x) = x^2 + 4$, for $x \leq 0$

c) $f(x) = \frac{2x+6}{x-3}$, $x \neq 3$

d) $f(x) = \sqrt{6+x}$, $x \geq -6$

Concept Check:

7. Suppose $f(x)$ is the number of cars that can be built for x dollars. What does $f^{-1}(1000)$ represent?

8. Suppose $f(r)$ is the volume (in cubic inches) of a sphere of radius r inches. What does $f^{-1}(5)$ represent?

9. Find $(f^{-1} \circ f)(2)$ knowing that f is a one-to-one function and $f(2) = 3$.

10. **Fee for Service** For his services, a private investigator requires a \$500 retention fee plus \$80 per hour. Let x represent the number of hours the investigator spends working on a case.

(a) Find a function f that models the investigator's fee as a function of x .

(b) Find f^{-1} . What does f^{-1} represent?

(c) Find $f^{-1}(1220)$. What does your answer represent?