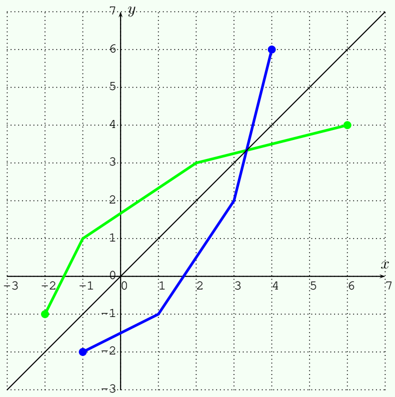
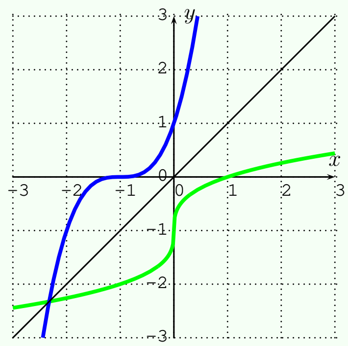
Solution.
Carefully reflecting the graphs given in part (a) and (b) gives the following solution. The function $f(x) = (x+1)^3$ in part (b) can be graphed with a graphing calculator first.

a) 

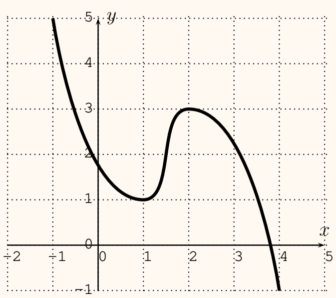
b) 

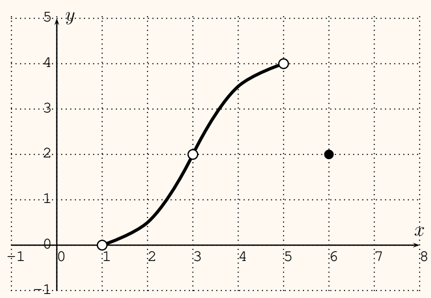
□

6.3 Exercises

Exercise 6.1

Use the horizontal line test to determine whether the function is one-to-one.

a) 

b) 

c) $f(x) = x^2 + 2x + 5$
d) $f(x) = x^2 - 14x + 29$
e) $f(x) = x^3 - 5x^2$
f) $f(x) = \frac{x^2}{x^2-3}$
g) $f(x) = \sqrt{x+2}$
h) $f(x) = \sqrt{|x+2|}$

Exercise 6.2

Find the inverse of the function f and check your solution.

a) $f(x) = 4x + 9$
b) $f(x) = -8x - 3$
c) $f(x) = \sqrt{x + 8}$
d) $f(x) = \sqrt{3x + 7}$
e) $f(x) = 6 \cdot \sqrt{-x - 2}$
f) $f(x) = x^3$
g) $f(x) = (2x + 5)^3$
h) $f(x) = 2 \cdot x^3 + 5$

i) $f(x) = \frac{1}{x}$
j) $f(x) = \frac{1}{x-1}$
k) $f(x) = \frac{1}{\sqrt{x-2}}$
l) $f(x) = \frac{-5}{4-x}$
m) $f(x) = \frac{x}{x+2}$
n) $f(x) = \frac{3x}{x-6}$
o) $f(x) = \frac{x+2}{x+3}$
p) $f(x) = \frac{7-x}{x-5}$
q) f given by the table below:

x	2	4	6	8	10	12
$f(x)$	3	7	1	8	5	2

Exercise 6.3

Restrict the domain of the function f in such a way that f becomes a one-to-one function. Find the inverse of f with the restricted domain.

a) $f(x) = x^2$
b) $f(x) = (x + 5)^2 + 1$
c) $f(x) = |x|$
d) $f(x) = |x - 4| - 2$
e) $f(x) = \frac{1}{x^2}$
f) $f(x) = \frac{-3}{(x+7)^2}$
g) $f(x) = x^4$
h) $f(x) = \frac{(x-3)^4}{10}$

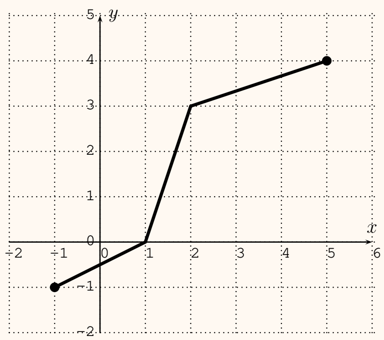
Exercise 6.4

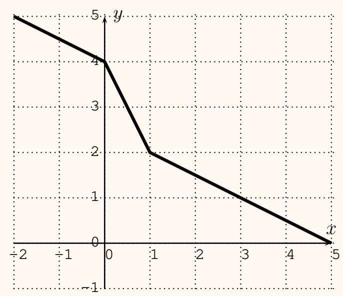
Determine whether the following functions f and g are inverse to each other.

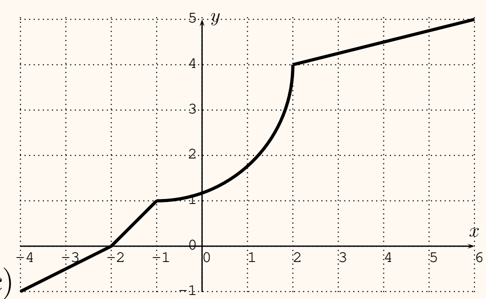
a) $f(x) = x + 3$ and $g(x) = x - 3$
b) $f(x) = -x - 4$ and $g(x) = 4 - x$
c) $f(x) = 2x + 3$ and $g(x) = x - \frac{3}{2}$
d) $f(x) = 6x - 1$ and $g(x) = \frac{x+1}{6}$
e) $f(x) = x^3 - 5$ and $g(x) = 5 + \sqrt[3]{x}$
f) $f(x) = \frac{1}{x-2}$ and $g(x) = \frac{1}{x} + 2$

Exercise 6.5

Draw the graph of the inverse of the function given below.

a) 

b) 

c) 

d) $f(x) = \sqrt{x}$ e) $f(x) = x^3 - 4$

f) $f(x) = 2x - 4$ g) $f(x) = 2^x$

h) $f(x) = \frac{1}{x-2}$ for $x > 2$ i) $f(x) = \frac{1}{x-2}$ for $x < 2$.