Domain and Range: Exercises 1- 6

Determine domain and range of the following functions:

Exercise 1: $f(x) = x - 2, \quad g(x) = -2x$

Exercise 2: $f(x) = x^2 - 4, \quad g(x) = -x^2 + 4$

Exercise 3: $f(x) = x^2 - 2, \quad g(x) = -0.5x^2 + 2x$

Exercise 4: $f(x) = x^3, \quad g(x) = -x^3 + 4x^2 - 4x$

Exercise 5: $f(x) = \sqrt{x}, \quad g(x) = \sqrt{x - 2}$

Exercise 6: $f(x) = \sqrt{x + 2}, \quad g(x) = \sqrt{x - 2} + 1$

Domain and Range: Exercises 7- 13

Exercise 7: $f(x) = \sin x, \quad g(x) = -2\sin x$

Exercise 8: $f(x) = \cos x, \quad g(x) = \cos^2 x$

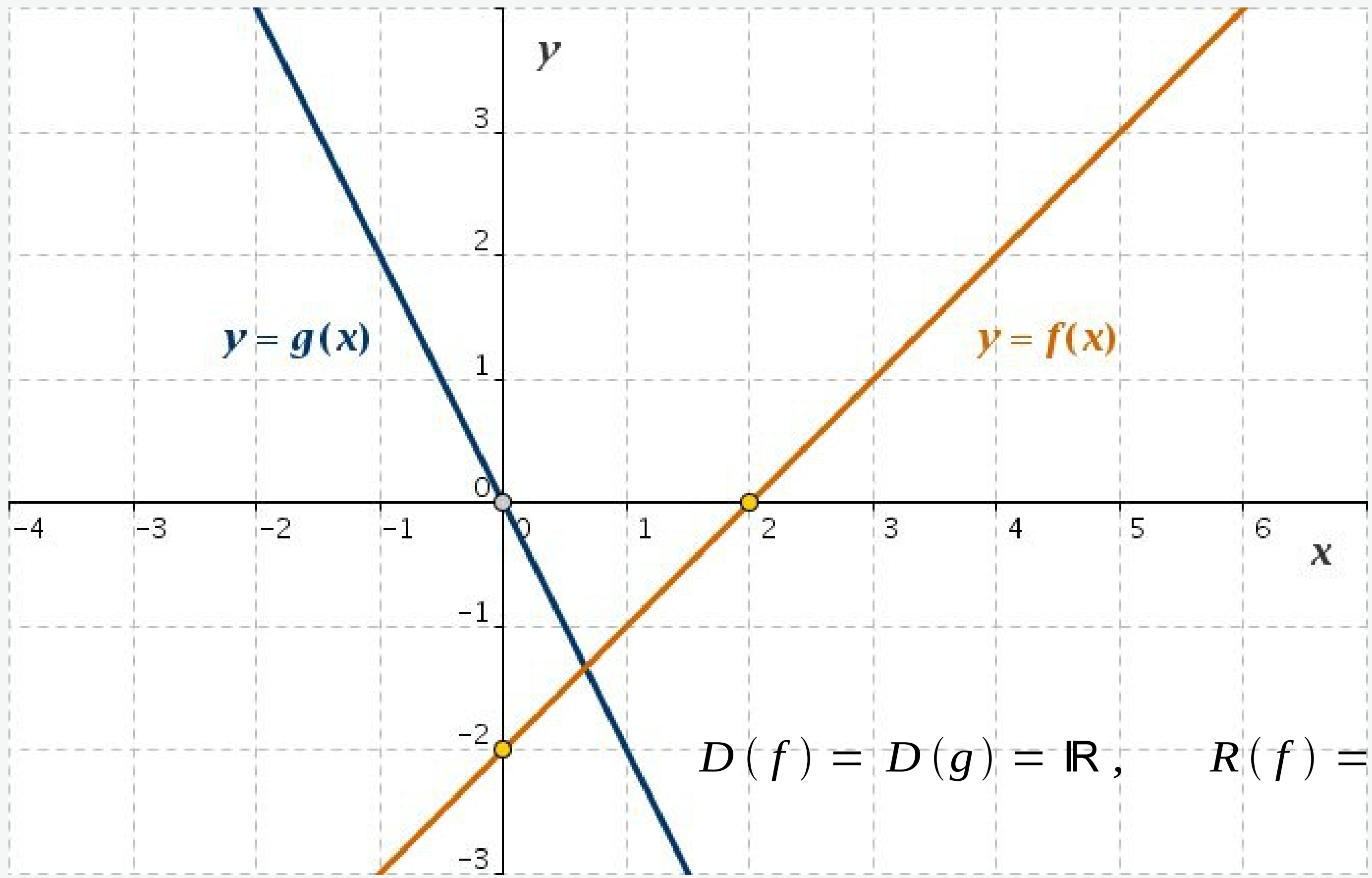
Exercise 9: $f(x) = e^x, \quad g(x) = e^x - 2$

Exercise 10: $f(x) = e^{-x}, \quad g(x) = e^{-x} + 2$

Exercise 11: $f(x) = 2e^x, \quad g(x) = \dfrac{1}{e^x + 1}$

Exercise 12: $f(x) = |x|, \quad g(x) = |x - 2|$

Exercise 13: $f(x) = |x| - 2, \quad g(x) = |x - 3| - 1$



$$D(f) = D(g) = \mathbb{R}, \qquad R(f) = R(g) = \mathbb{R}$$

Fig. L1: Linear functions $y = f(x)$ and $y = g(x)$

$$f(x) = x - 2, \qquad g(x) = -2x$$

$$D(f) = D(g) = \mathbb{R}, \qquad R(f) = R(g) = \mathbb{R}$$

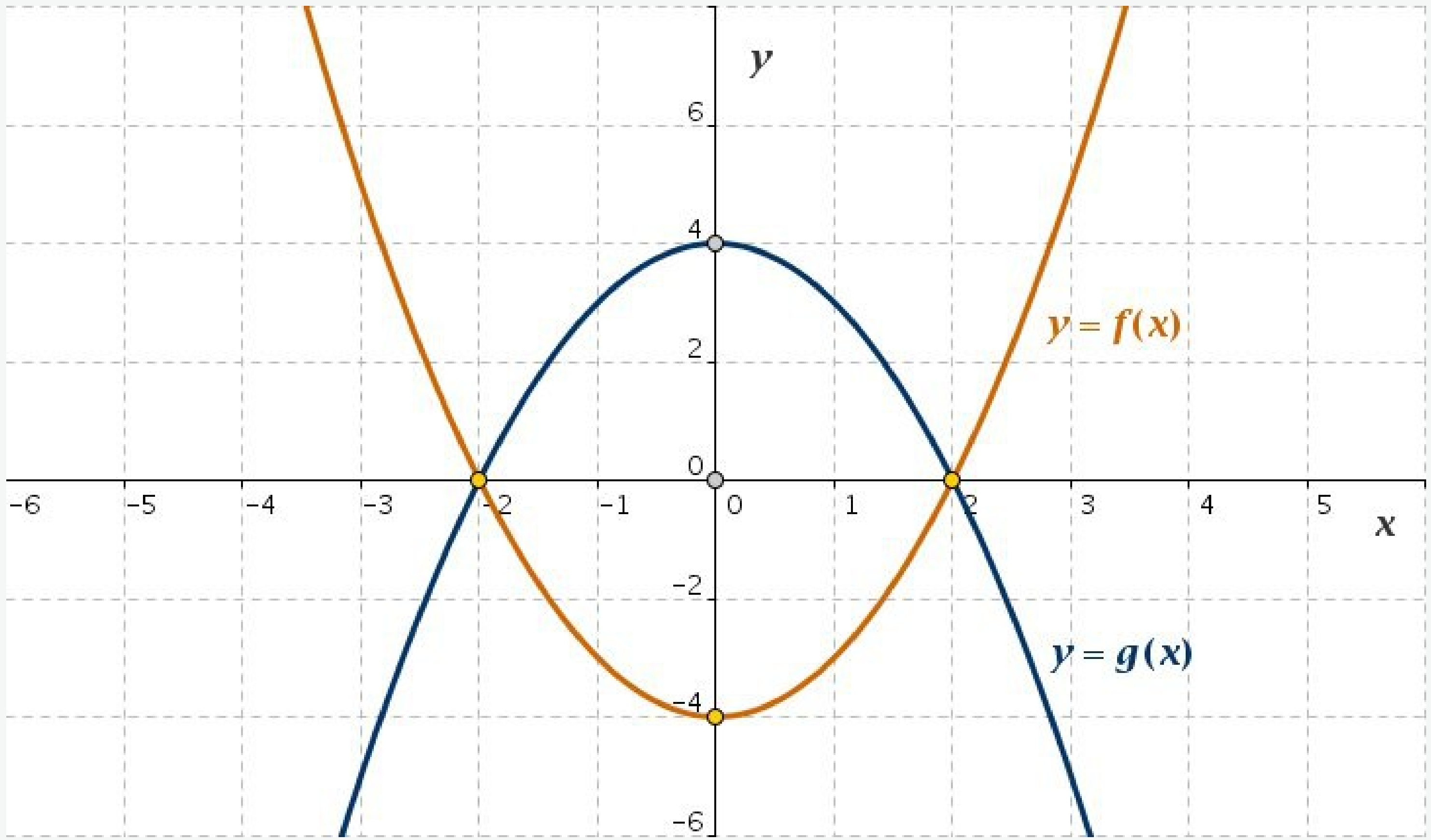


Fig. L2: Quadratic functions $y = f(x)$ and $y = g(x)$

$$f(x) = x^2 - 4, \qquad g(x) = -x^2 + 4$$

$$f(x) = x^2 - 4, \quad D(f) = \mathbb{R}, \quad R(f) = [-4, \infty)$$

$$g(x) = -x^2 + 4, \quad D(g) = \mathbb{R}, \quad R(g) = (-\infty, 4]$$

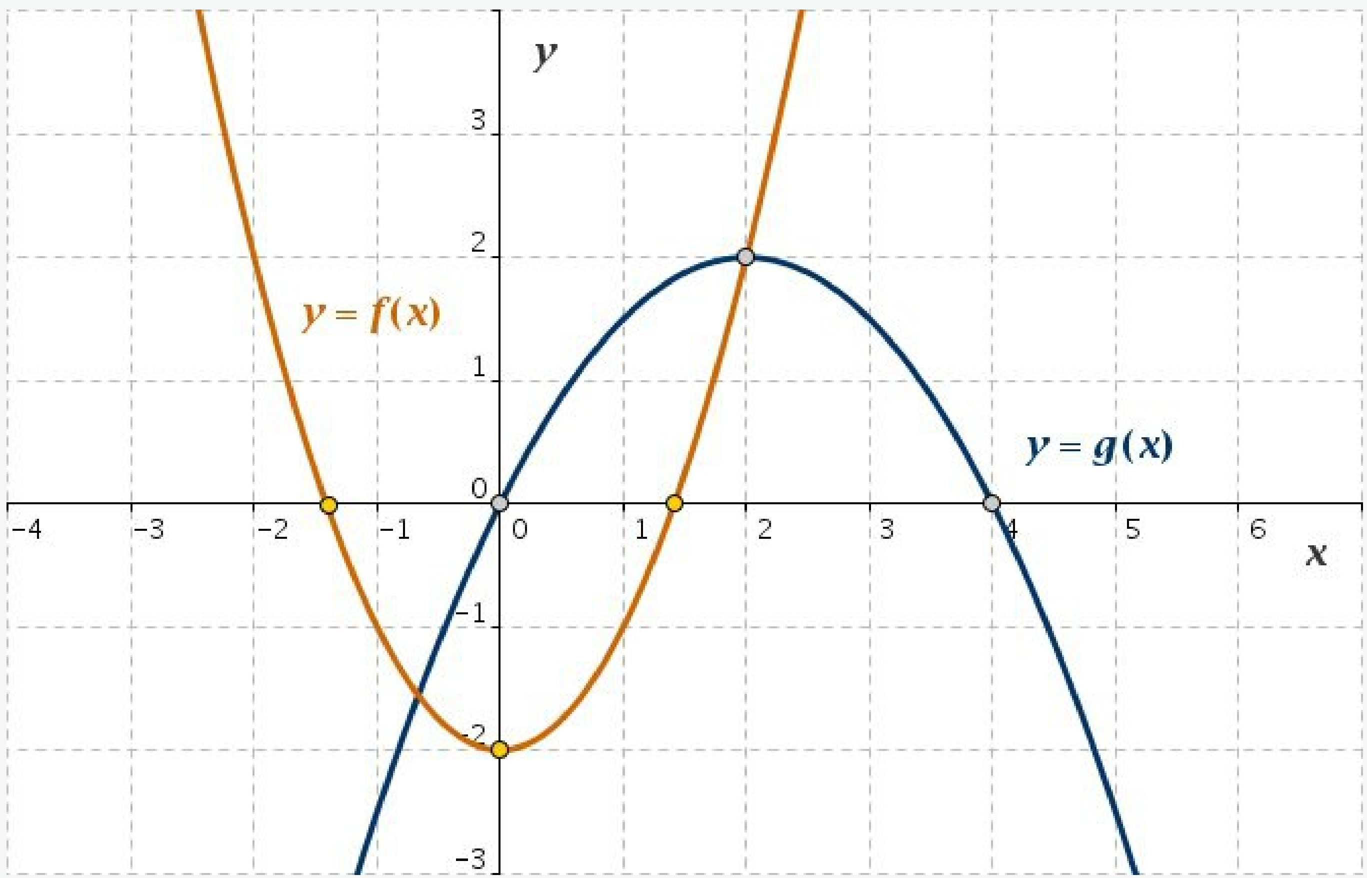


Fig. L3: Quadratic functions $y = f(x)$ and $y = g(x)$

$$f(x) = x^2 - 2, \quad D(f) = \mathbb{R}, \quad R(f) = [-2, \infty)$$

$$g(x) = -0.5x^2 + 2x, \quad D(g) = \mathbb{R}, \quad R(g) = (-\infty, 2]$$

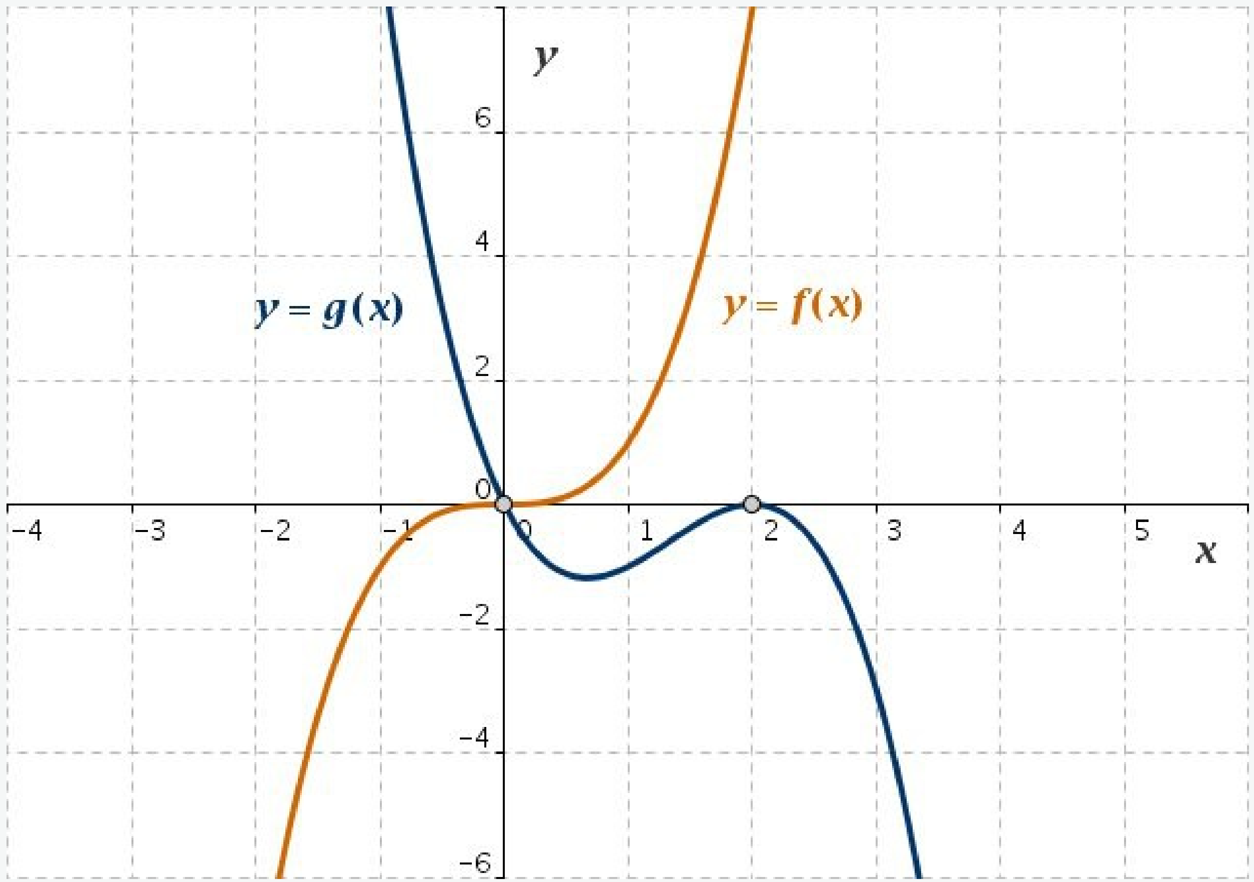


Fig. L4: Cubic functions $y = f(x)$ and $y = g(x)$

$$f(x) = x^3, \quad D(f) = \mathbb{R}, \quad R(f) = \mathbb{R}$$

$$g(x) = -x^3 + 4x^2 - 4x, \quad D(g) = \mathbb{R}, \quad R(g) = \mathbb{R}$$

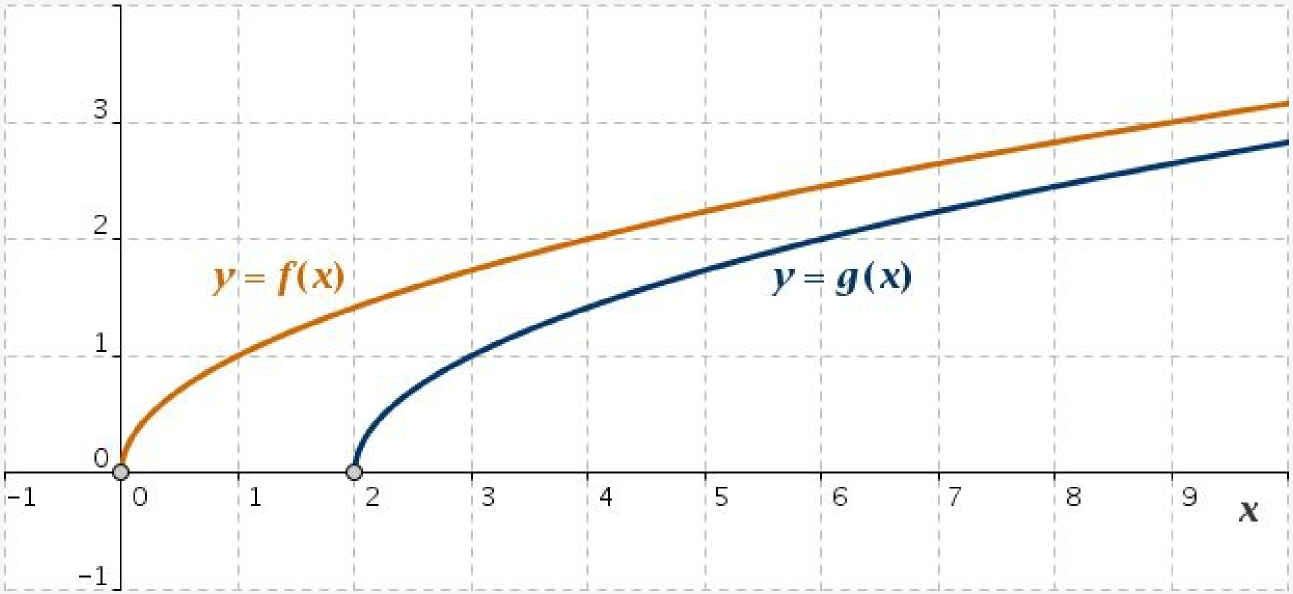


Fig. L5: Root functions $y = f(x)$ and $y = g(x)$

$$f(x) = \sqrt{x}, \quad D(f) = [0, \infty), \quad R(f) = [0, \infty)$$

$$g(x) = \sqrt{x-2}, \quad D(g) = [2, \infty), \quad R(g) = [0, \infty)$$

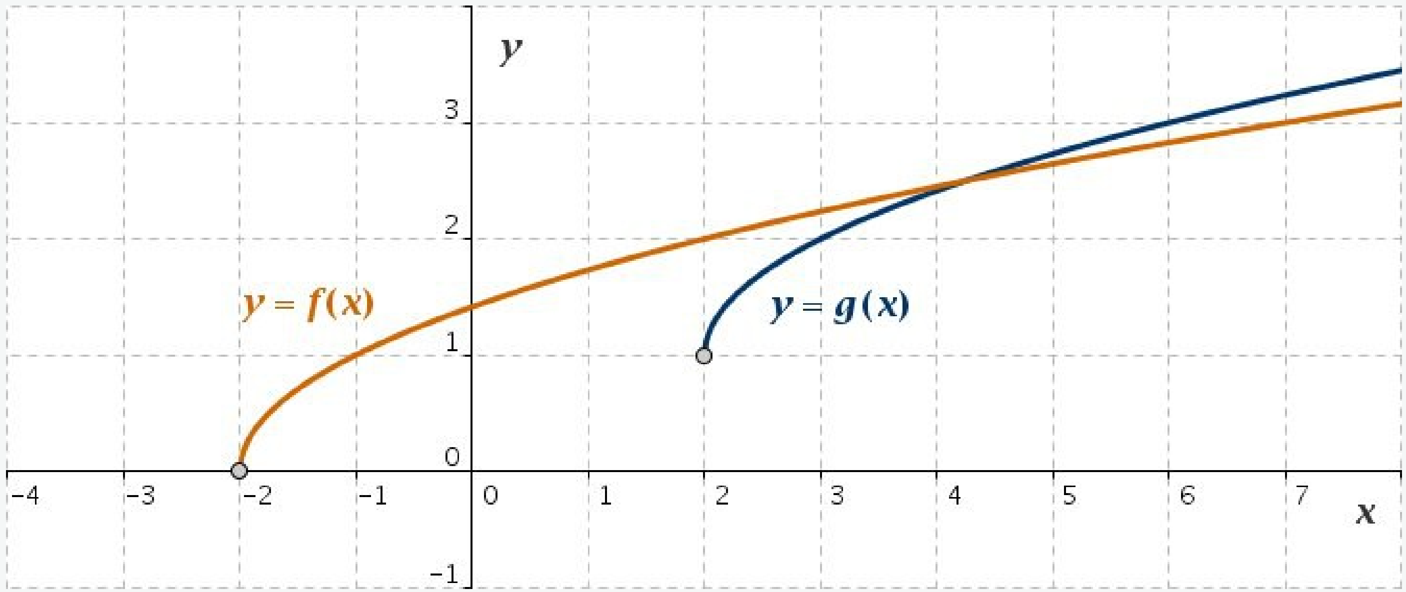


Fig. L6: Root functions y = f (x) and y = g (x)

$$f(x) = \sqrt{x+2}, \quad D(f) = [-2, \infty), \quad R(f) = [0, \infty)$$

$$g(x) = \sqrt{x-2} + 1, \quad D(g) = [2, \infty), \quad R(g) = [1, \infty)$$

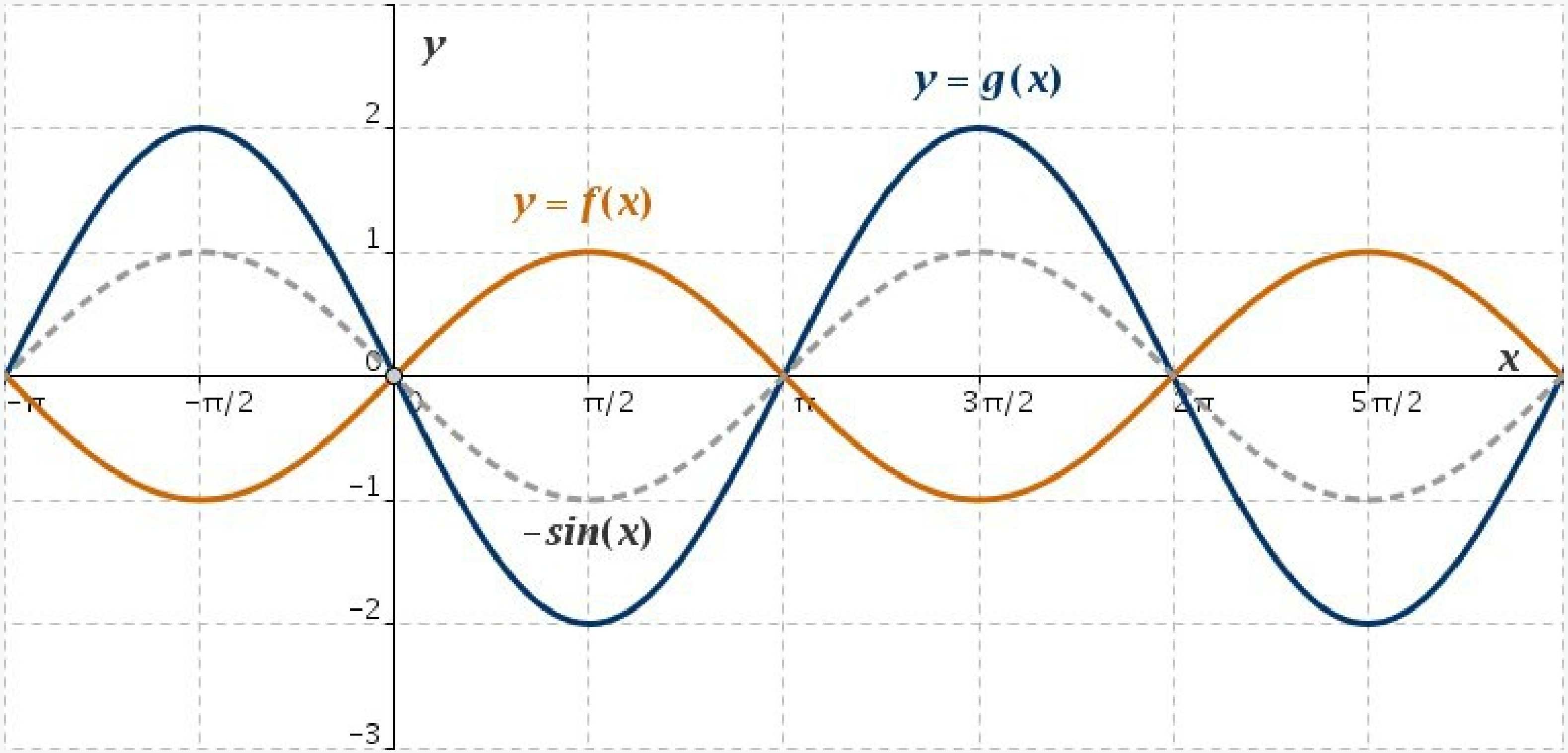


Fig. L7: Trigonometric functions $y = f(x)$ *and* $y = g(x)$

$$f(x) = \sin x , \quad D(f) = \mathbb{R} , \quad R(f) = [-1, 1]$$

$$g(x) = -2 \sin x , \quad D(g) = \mathbb{R} , \quad R(g) = [-2, 2]$$

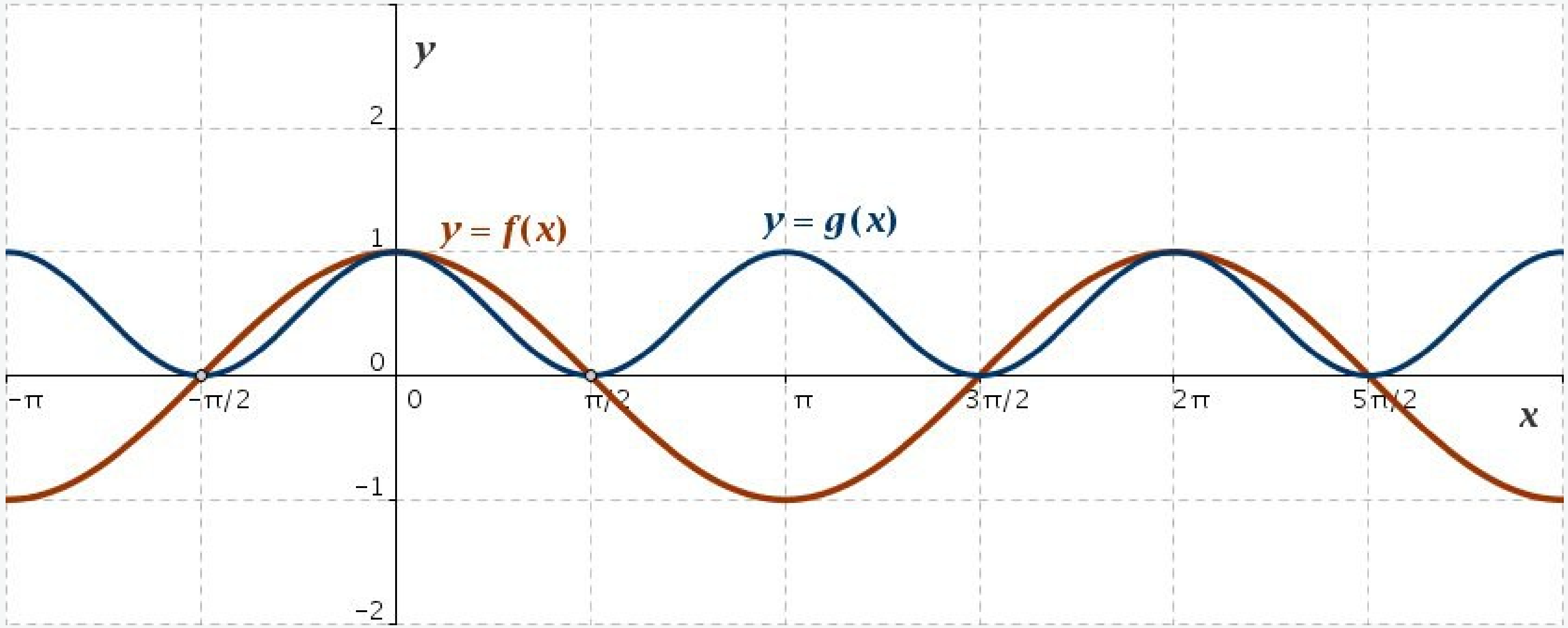


Fig. L8: Trigonometric functions $y = f(x)$ and $y = g(x)$

$$f(x) = \cos x, \qquad D(f) = \mathbb{R}, \qquad R(f) = [-1, 1]$$

$$g(x) = \cos^2 x, \qquad D(g) = \mathbb{R}, \qquad R(g) = [0, 1]$$

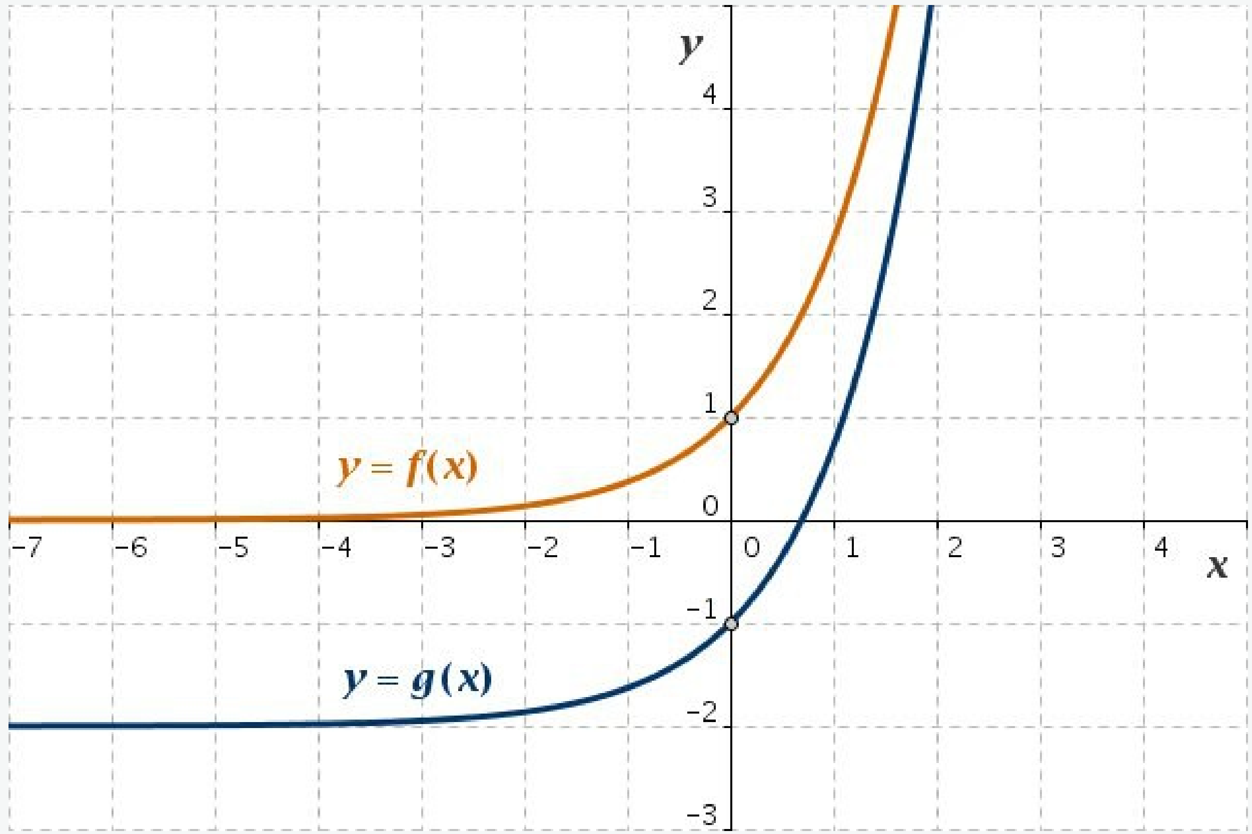


Fig. L9: Exponential functions $y = f(x)$ and $y = g(x)$

$$f(x) = e^x, \quad D(f) = \mathbb{R}, \quad R(f) = (0, \infty)$$

$$g(x) = e^x - 2, \quad D(g) = \mathbb{R}, \quad R(g) = (-2, \infty)$$

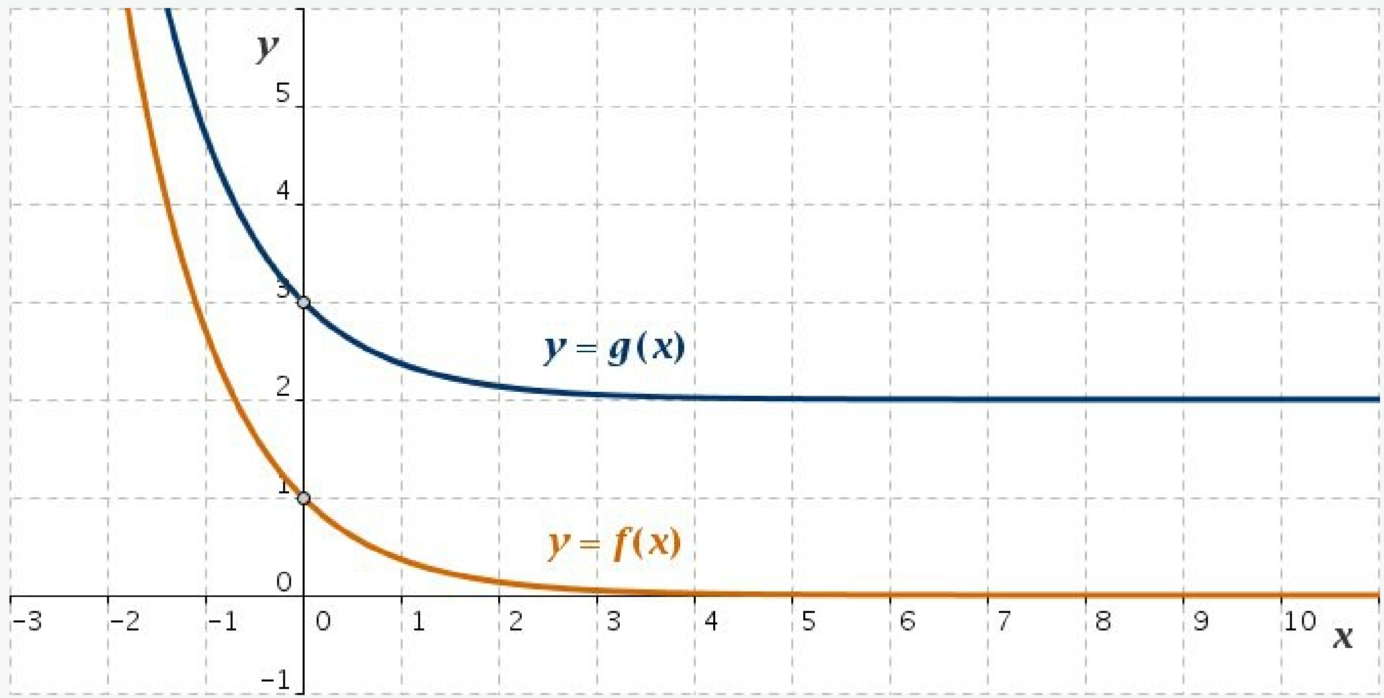


Fig. L10: Exponential functions $y = f(x)$ and $y = g(x)$

$$f(x) = e^{-x}, \qquad D(f) = \mathbb{R}, \qquad R(f) = (0, \infty)$$

$$g(x) = e^{-x} + 2, \qquad D(g) = \mathbb{R}, \qquad R(g) = (2, \infty)$$

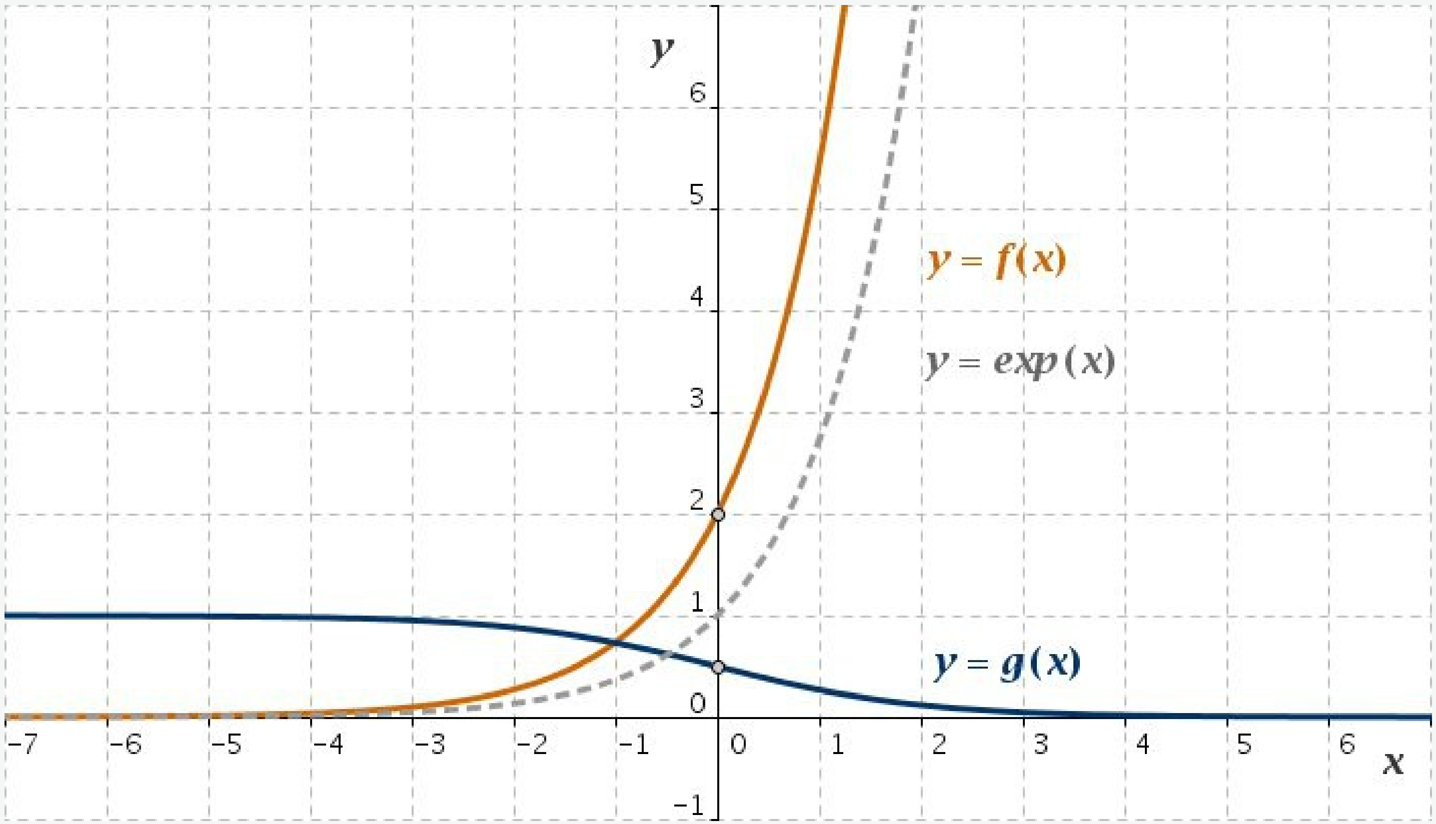


Fig. L11: Exponential functions $y = f(x)$ and $y = g(x)$

$$f(x) = 2e^x, \qquad D(f) = \mathbb{R}, \qquad R(f) = (0, \infty)$$

$$g(x) = \frac{1}{e^x + 1}, \qquad D(g) = \mathbb{R}, \qquad R(g) = [0, 1]$$

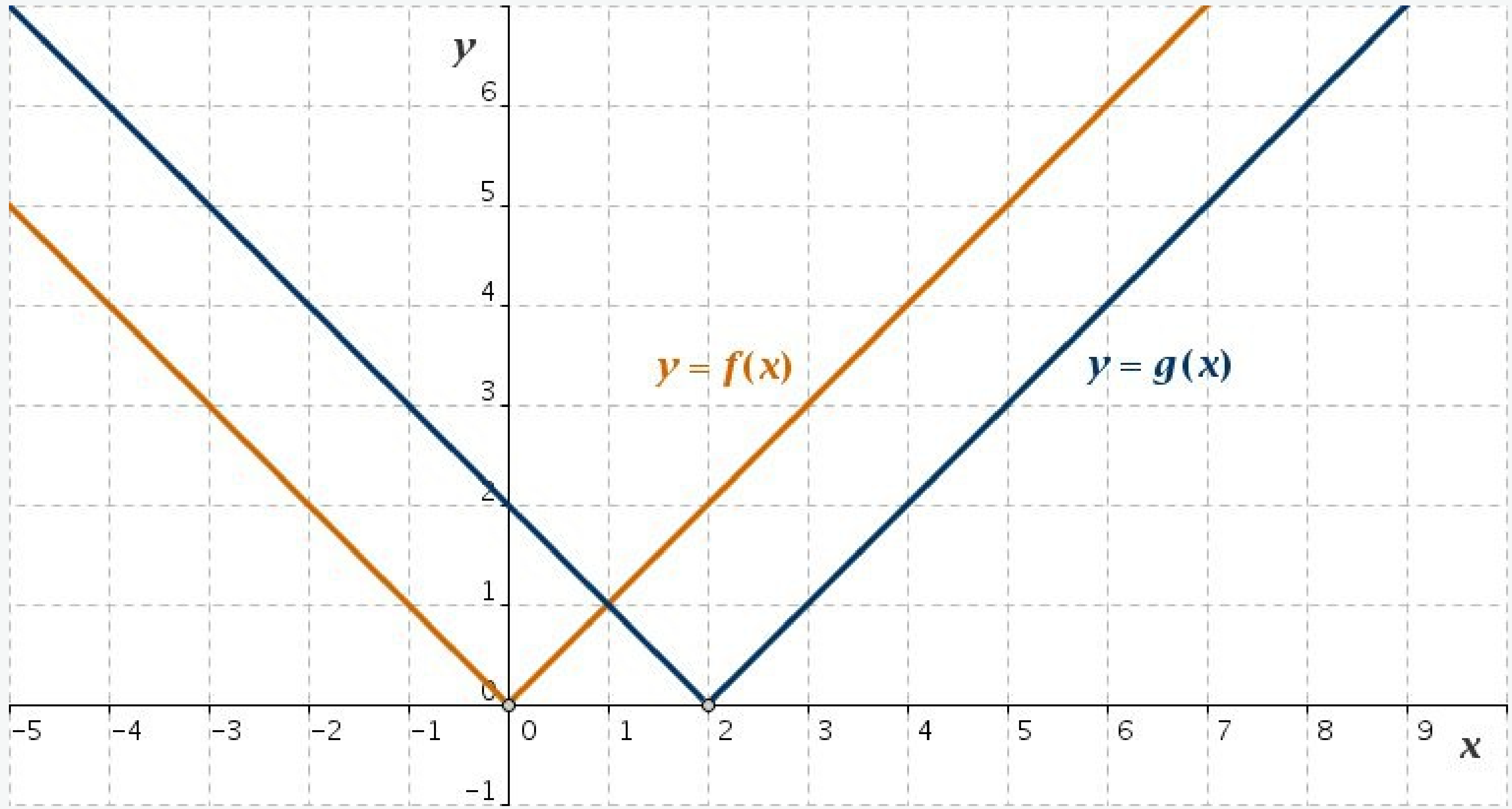


Fig. L12: Absolute value functions $y = f(x)$ and $y = g(x)$

$$f(x) = |x|, \quad D(f) = \mathbb{R}, \quad R(f) = [0, \infty)$$

$$g(x) = |x - 2|, \quad D(g) = \mathbb{R}, \quad R(g) = [0, \infty)$$

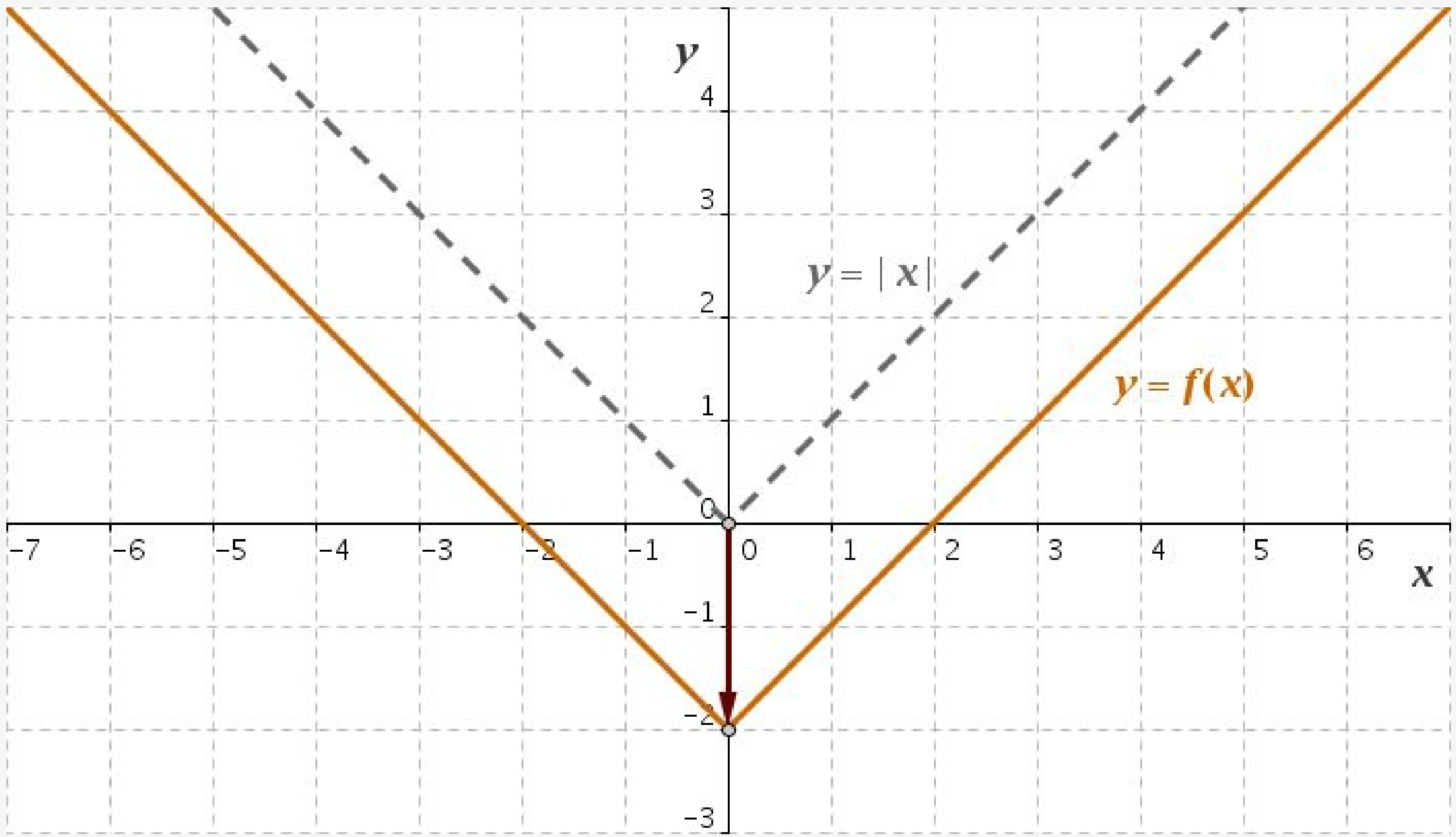


Abb. L13-1: Absolute value function $y = | x | - 2$

$$f(x) = |x| - 2, \qquad D(f) = \mathbb{R}, \qquad R(f) = [-2, \infty)$$

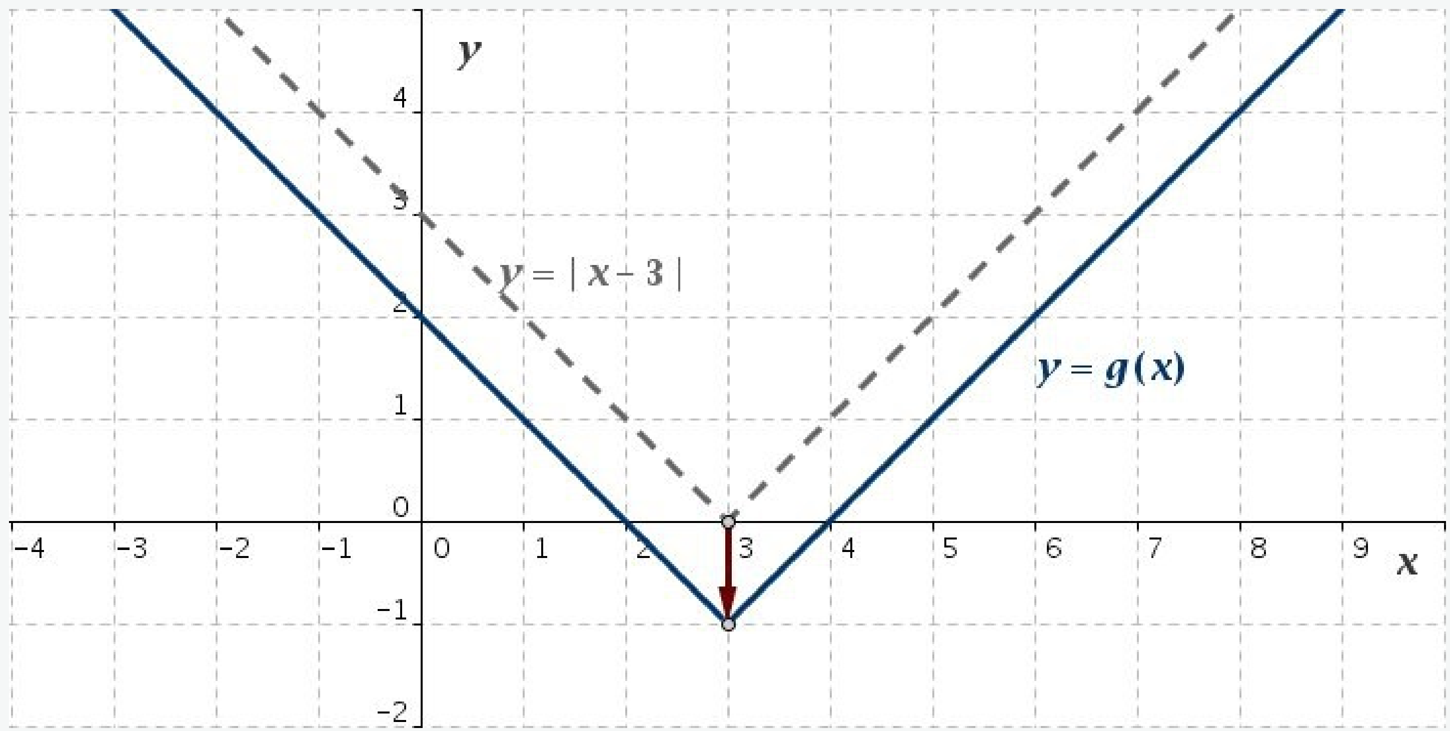


Fig. L13-2: Absolute value function y = | x - 3| - 1

$$g(x) = |x - 3| - 1, \quad D(g) = \mathbb{R}, \quad R(g) = [-1, \infty)$$