1 Evaluating Functions

We first practice evaluation functions. Keep everything in exact form (i.e., no calculator).

Define the following functions

$$f(x) = x^2 - x - 1 \qquad g(x) = \frac{1}{x-4}$$
$$h(x) = \sqrt{x^2 - 4} \qquad k(x) = x + 1$$

Compute the following

1. $f\left(\frac{1+\sqrt{5}}{2}\right)$
2. $g\left(\frac{2}{3}\right)$
3. $h(\sqrt{8})$
4. $k(1)$
5. $f\left(g\left(\frac{1}{2}\right)\right)$
6. $g\left(k(3) + \frac{1}{2}\right)$
7. $h(g(x))$
8. $f(h(g(1)))$
9. $h(g(k(f(4))))$
10. $f(g(h(k(x))))$, with everything in one fraction.

Next, define the following functions

$$f(x) = \sqrt{x} \qquad g(x) = x^2 + 2x + 1$$

Compute the following

1. $f(4)$
2. $g(1)$
3. $f(g(1))$
4. What is the simplest way you can write $g(f(x))$?
5. What is the simplest way you can write $f(g(x))$?

2 Sets

Next, we practice working with sets.

Draw the following sets on the real number line:

1. $A := \{x \in \mathbb{R} : x \leq 4\}$
2. $B := \left\{x \in \mathbb{N} : x^2 \geq 9\right\}$
3. $C := \{x \in \mathbb{Z} : |x| < 5\}$
4. $D := \{x \in \mathbb{R} : \text{Tens place of } x \text{ is even}\}$
5. $E := \{x \in \mathbb{Z} : 2 \text{ divides } x\}$