The difference quotient:
\[ \frac{f(x+h) - f(x)}{h} \quad h \neq 0 \]

ex: \( f(x) = -2x^2 - x - 1 \) Find \( \frac{f(x+h) - f(x)}{h} \)

ans: \( -1 - 2h - 4x \)

Explicit domain - Sometimes the domain is stated explicitly, e.g.: \( f(x) = |x| \)
\[ x < 0 \]

Implicit domain - Sometimes the domain is implied.
\[ f(x) = \sqrt{x} \]

We know \( (0, \infty) \) or \( x \geq 0 \)

We choose the largest set of \( \mathbb{R} \) for which the function is defined.

Find the domain
\[ f(x) = \frac{x-1}{2x^2 - 32} \quad h(x) = \sqrt{-9 - 3x} \quad g(x) = \frac{\sqrt{x-1}}{x} \]