

MATH 125 QUIZ #1 (SPRING 2021)

**1** Let  $f(x) = \frac{3}{x-7}$  and  $g(x) = \sqrt{3-x}$ .

(a) Find the domain of  $f$ .

$$\text{Dom } f = \{x : x \neq 7\} = (-\infty, 7) \cup (7, \infty).$$

(b) Find the domain of  $g$ .

$$\text{Dom } g = \{x : 3 - x \geq 0\} = \{x : x \leq 3\} = (-\infty, 3].$$

(c) Find the domain of  $f/g$ .

Simplifying, we get

$$\begin{aligned} \text{Dom}(f/g) &= \{x : x \in \text{Dom } f \cap \text{Dom } g \ \& \ g(x) \neq 0\} = \{x : x \neq 7, x \leq 3, x \neq 3\} \\ &= \{x : x < 3\} = (-\infty, 3). \end{aligned}$$

(d) Find  $f - f$  and its domain.

$$(f - f)(x) = f(x) - f(x) = 0 \text{ with } \text{Dom}(f - f) = \text{Dom } f = \{x : x \neq 7\} = (-\infty, 7) \cup (7, \infty).$$

(e) Find the domain of  $g/f$ .

Simplifying, we get

$$\begin{aligned} \text{Dom}(g/f) &= \{x : x \in \text{Dom } g \cap \text{Dom } f \ \& \ f(x) \neq 0\} = \{x : x \neq 7, x \leq 3\} \\ &= \{x : x \leq 3\} = (-\infty, 3]. \end{aligned}$$