

MATH 125 QUIZ #1 (FALL 2020)

**1** Let  $f(x) = \sqrt{x-1}$  and  $g(x) = \sqrt{6-x}$ .

(1a) Find the domains of  $f$  and  $g$ .

$$\text{Dom } f = \{x : x \geq 1\} = [1, \infty) \text{ and } \text{Dom } g = \{x : 6 - x \geq 0\} = \{x : x \leq 6\} = (-\infty, 6].$$

(1b) Find  $f/g$ .

$$(f/g)(x) = \sqrt{\frac{x-1}{6-x}}.$$

(1c)

$$\text{Dom}(f/g) = \{x : x \in \text{Dom } f \cap \text{Dom } g \text{ and } g(x) \neq 0\} = \{x : x \in [1, 6] \text{ and } x \neq 6\} = [1, 6).$$

**2** Find the function whose graph is that of  $y = \sqrt{x}$  after the following transformations: (i) Shift down 3; (ii) Shift right 10; (iii) Reflect about the  $x$ -axis.

$$y = \sqrt{x} - 3 \rightarrow y = \sqrt{x-10} - 3 \rightarrow y = -\sqrt{x-10} + 3.$$

**3** A circle of radius  $r$  is inscribed in a square.

(3a) Express area  $A$  of the square as a function of  $r$ .

$$\text{Diameter of circle is } 2r, \text{ which is the length of each side of the square, and so } A(r) = 4r^2.$$

(3b) Express perimeter  $p$  of the square as a function of  $r$ .

$$\text{Length of each side of the square is } 2r, \text{ so } p(r) = 8r.$$

