

Problem 2 (15 points). For the following problem use  $f(x) = \sqrt{x+2}$  and  $g(x) = 4x^2 + 4x + 1$ .

(5 pts) a) Find the domain of  $f(x)$ .

$$x+2 \geq 0$$

$$x \geq -2$$

(5 pts) b) Find the domain of  $g(x)$ .

All Real numbers

(5 pts) c) Find the domain of  $\frac{f}{g}(x)$ .

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

So

$$x+2 \geq 0 \Rightarrow x \geq -2$$

and

$4x^2+4x+1 \neq 0$  (or use Quadratic formula)

$$(2x+1)(2x+1) \neq 0$$

$$2x+1 \neq 0$$

$$2x \neq -1$$

$$x \neq -\frac{1}{2}$$

3

So Domain of  $\frac{f}{g}(x)$ :  $[-2, -\frac{1}{2}) \cup (-\frac{1}{2}, \infty)$