MAT 131 In class problem 1

Domain of $g(x)$: $2 - x \geq 0$

$-2 \quad -2$

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

$\boxed{x \leq 2}$ same as $\boxed{(-\infty, 2]}$

Domain of $f(x)$: $\boxed{\mathbb{R}, \text{ but } x \neq 4}$ same as $\boxed{(-\infty, 4) \cup (4, \infty)}$

Domain of $(f \circ g)(x)$:

$(f \circ g)(x) = f(g(x))$ $f(x)$ cannot be found if $x = 4$

$f(g(x)) = \frac{2}{\sqrt{2-x} - 4}$ Find the spot where $g(x) = 4$

This means $\sqrt{2-x} = 4$

$(\sqrt{2-x})^2 = 4^2$

$2 - x = 16$

$-2 \quad -2$

$\frac{-x}{-1} = \frac{14}{-1}$

$x = -14$

So $x \neq -14$

Alternatively! $\sqrt{2-x} - 4 \neq 0$

$+4 \quad +4$

$\sqrt{2-x} \neq 4$

$(\sqrt{2-x})^2 \neq 4^2$

$2 - x \neq 16$

$-2 \quad -2$

$\frac{-x}{-1} \neq \frac{14}{-1}$

$x \neq -14$

Domain: $x \leq 2$, but $x \neq -14$

$\boxed{\text{Domain: } x \leq 2, \text{ but } x \neq -14}$

Same as

$(-\infty, -14) \cup (-14, 2]$