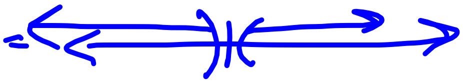
$$g(x) = \sqrt{x+4}, \quad f(x) = \frac{96x^2 - \pi}{x-5}$$

$\mathcal{D}$ = Domain

$\mathcal{D}(f) = \mathbb{R} \setminus \{5\}$ from

Need $x - 5 \neq 0$

$\{x \mid x \neq 5\} = \mathcal{D}(f)$

= 

$= (-\infty, 5) \cup (5, \infty)$

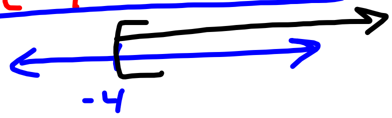
$$(f \pm g)(x) = \sqrt{x+4} \pm \frac{96x^2 - \pi}{x-5}$$

$$(fg)(x) = \left(\sqrt{x+4}\right)\left(\frac{96x^2 - \pi}{x-5}\right)$$

$$\left(\frac{f}{g}\right)(x) = \frac{\frac{96x^2 - \pi}{x-5}}{\sqrt{x-4}}$$

$\mathcal{D}(g)$: Need $x + 4 \geq 0$

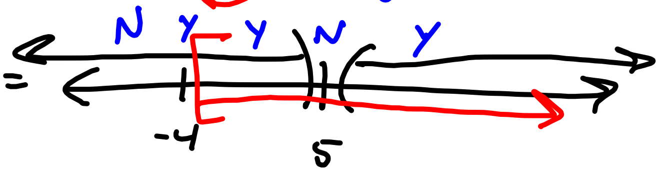
$$\boxed{\{x \mid x \geq -4\}}$$

= 

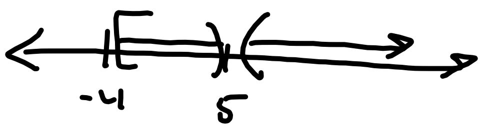
$$\boxed{= [-4, \infty)}$$

$\mathcal{D}(f+g) = \{x \mid x \in \mathcal{D}(f) \text{ and } x \in \mathcal{D}(g)\}$

$= \mathcal{D}(f) \cap \mathcal{D}(g)$

= 

AND

= 

$= [-4, 5) \cup (5, \infty)$

$= \{x \mid x \neq 5 \text{ and } x \geq -4\}$

$$f(x) = \frac{96x^2-\pi}{x-5}, \quad g(x) = \sqrt{x-4}$$

$$(f \circ g)(x) = f(g(x)) = \frac{96\,g(x)^2-\pi}{g(x)-5}$$

argument

$$f(\text{☺}) = \frac{96\,\text{☺}^2-\pi}{\text{☺}-5}$$

$$f\left(\boxed{\sqrt{x-4}}\right) = \frac{96\boxed{\sqrt{x-4}}^{\,2}-\pi}{\boxed{\sqrt{x-4}}-5}$$

$$\mathcal{D}(f \circ g) = \mathcal{D}(f(g(x)))$$

$$\boxed{* = \{x \mid x \in \mathcal{D}(g) \text{ and } g(x) \in \mathcal{D}(f)\}}$$

$$= \{x \mid x \geq -4 \text{ and } \sqrt{x-4} \neq 5\}$$

Scratch: $\sqrt{x-4} \neq 5$

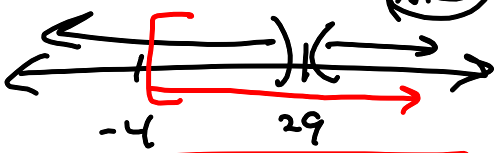
$$(\sqrt{x-4})^2 \neq 5^2$$

$$x-4 \neq 25$$

$$x \neq 29$$

$$= \{x \mid x \geq -4 \text{ and } x \neq 29\}$$

AND



$$\boxed{= [-4, 29) \cup (29, \infty)}$$

$\mathcal{D}(f+g) = \mathcal{D}(f-g) = \mathcal{D}(fg) = \mathcal{D}(f) \cap \mathcal{D}(g)$

what about $\mathcal{D}\left(\frac{f}{g}\right)$?

It's also like the 4 domains above, but $g(x) \neq 0$

important ~~addition~~ restriction

So need to exclude $\{x \mid g(x) = 0\}$

$\mathcal{D}(f+g) = [-4,5) \cup (5,\infty)$. ALSO

throw out where $g(x) = 0$

$g(x) = \sqrt{x+4} \neq 0$

$x+4 \neq 0$

$x \neq -4$, so throw out $x = -4$

$\mathcal{D}\left(\frac{f}{g}\right) = (-4,5) \cup (5,\infty)$

Square bracket became round bracket.

$$y = -3\sqrt{-6(x-3)} + 5$$

$(3,5)$

$$a\sqrt{b(x-h)} + k$$

$$(3,5) = (h,k)$$