

Partial Review: Sections 1.5 & 1.6

① given $f(x) = \sqrt{4-x^2}$ and $g(x) = \frac{x^2}{x+1}$,
find $(\frac{f}{g})(x)$ and $\text{Dom } \frac{f}{g}$

② given $f(x) = x^4$ and $g(x) = \frac{x}{x+2}$,
find $(g-f)(x)$, $(\frac{f}{g})(x)$, and $\text{Dom } \frac{f}{g}$

③ given $f(x) = \sqrt{x^2-9}$ on $(-\infty, -3]$,
find f^{-1} and graph f and f^{-1}

Solutions for Partial Review: Sections 1.5 & 1.6

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

$$\begin{aligned} \left(\frac{f}{g}\right)(x) &= \frac{f(x)}{g(x)} = \frac{\sqrt{4-x^2}}{\frac{x^2}{x+1}} \\ &= \frac{\sqrt{4-x^2}}{\frac{x^2}{x+1}} \cdot \frac{x+1}{x+1} \\ &= \frac{(x+1)\sqrt{4-x^2}}{x^2} \end{aligned}$$

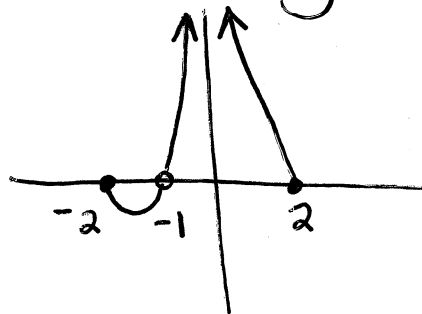
$$\text{Dom } f = [-2, 2]$$

$$\text{Dom } g = \mathbb{R} - \{-1\}$$

$$g(x) = 0 \text{ for } x = 0$$

$$\therefore \text{Dom } \frac{f}{g} = [-2, 2] - \{-1, 0\}$$

★ practice checking on calc!!



$$\textcircled{2} \quad f(x) = x^4 \quad g(x) = \frac{x}{x+2}$$

$$(g-f)(x) = g(x) - f(x)$$

$$= \frac{x}{x+2} - x^4 = \frac{x}{x+2} - x^4 \left(\frac{x+2}{x+2} \right)$$

$$= \frac{x - x^5 - 2x^4}{x+2}$$

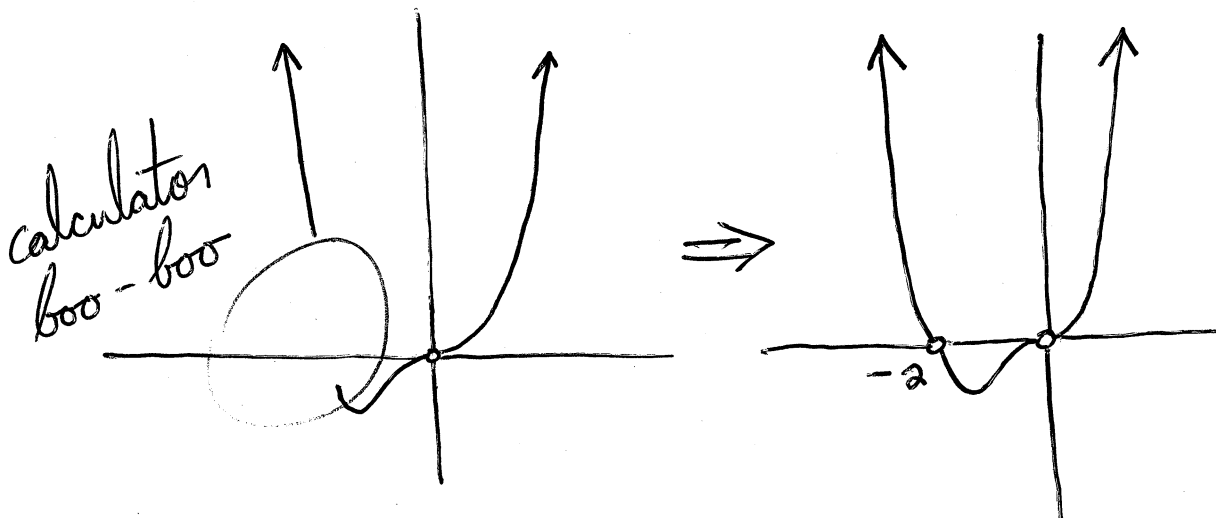
$$\left(\frac{f}{g} \right)(x) = \frac{x^4}{\frac{x}{x+2}} = x^4 \cdot \frac{x+2}{x} = x^3(x+2) \\ = x^4 + 2x^3$$

$$\text{Dom } f = \mathbb{R}$$

$$\text{Dom } g = \mathbb{R} - \{-2\}$$

$$g(x) = 0 \text{ for } x = 0$$

$$\therefore \text{Dom } \frac{f}{g} = \mathbb{R} - \{-2, 0\}$$



$$\textcircled{3} \quad f(x) = \sqrt{x^2 - 9} \quad \text{on } (-\infty, -3]$$

$$\text{let } f(f^{-1}(x)) = x$$

$$\sqrt{[f^{-1}(x)]^2 - 9} = x$$

$$[f^{-1}(x)]^2 - 9 = x^2$$

$$[f^{-1}(x)]^2 = x^2 + 9$$

$$f^{-1}(x) = -\sqrt{x^2 + 9}$$

choose neg

$$\text{RNG } f = [0, \infty) = \text{Dom } f^{-1}$$

$$\therefore f^{-1}(x) = -\sqrt{x^2 + 9} \quad \text{on } [0, \infty)$$

