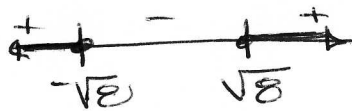


Final Exam Review

1. a) Dom  $g$ :  $x^2 - 8 \geq 0 \Rightarrow (x + \sqrt{8})(x - \sqrt{8}) \geq 0$



Dom  $g$ :  $(-\infty, -\sqrt{8}] \cup [\sqrt{8}, \infty)$

b)  $(f \circ g)(x) = f(g(x)) = f(\sqrt{x^2 - 8}) = \frac{1}{(\sqrt{x^2 - 8})^2} = \frac{1}{x^2 - 8}$

c) Dom  $g(f \circ g)(x)$ :  $(-\infty, -\sqrt{8}) \cup (\sqrt{8}, \infty)$

d)  $\frac{f(x+h) - f(x)}{h} = \frac{\left[ \frac{1}{(x+h)^2} - \frac{1}{x^2} \right] (x^2)(x+h)^2}{\left[ \frac{h}{1} \right] (x^2)(x+h)^2}$

$= \frac{x^2 - (x+h)^2}{hx^2(x+h)^2} = \frac{x^2 - (x^2 + 2xh + h^2)}{hx^2(x+h)^2} = \frac{x^2 - x^2 - 2xh + h^2}{hx^2(x+h)^2}$

$\frac{h(-2x+h)}{hx^2(x+h)^2} = \frac{-2x+h}{x^2(x+h)^2}$

2. a) Domain:  $[-3, 1]$

b) Range:  $[0, 4]$

c)  $f(1) = 0$

d)  $(-3, -2)$

NOTE: only use x-values here!