

Finding The Domain of A Function

1) $\frac{1}{0}$ BAD

2) $\sqrt{-}$ BAD

$$f(x) = \frac{1}{x-2}$$

$$\begin{array}{r} x-2=0 \\ +2 \quad +2 \\ \hline x=2 \end{array}$$

Dividing By 0 is Undefined

$$\text{Domain: } (-\infty, 2) \cup (2, \infty) \text{ exclusive}$$

$$-\infty \text{ } \overbrace{\text{~~~~~}}^{\text{~~~~~}} \text{ } \underbrace{\text{~~~~~}}_{\text{~~~~~}} \text{ } +\infty$$

$$f(x) = \frac{1}{x^2 - x - 6}$$

$$x^2 - x - 6 = 0$$

$$\downarrow$$

$$(x+2)(x-3) = 0$$

$$3 \cdot 2 = 6$$

$$3 - 2 = 1$$

$$\boxed{2-3=-1}$$

$$x+2=0$$

$$-2 \quad -2$$

$$\boxed{x=-2}$$

$$x-3=0$$

$$+3 \quad +3$$

$$\boxed{x=3}$$

$$x < -2 \quad -2 < x < 3 \quad x > 3$$

$$\text{~~~~~} \text{ } \underbrace{\text{~~~~~}}_{\text{~~~~~}} \text{ } \underbrace{\text{~~~~~}}_{\text{~~~~~}} \text{ } \underbrace{\text{~~~~~}}_{\text{~~~~~}}$$

$$\text{Domain: } (-\infty, -2) \cup (-2, 3) \cup (3, \infty)$$

$$f(x) = \frac{\sqrt{x-1}}{x^2+4} \rightarrow \text{No Restriction if plugging in negative and positive values}$$

$$x-1 \geq 0$$

$$\begin{array}{cc} +1 & +1 \\ \hline \end{array}$$

$$\boxed{x \geq 1}$$

$$\boxed{\text{Domain } [1, \infty)}$$

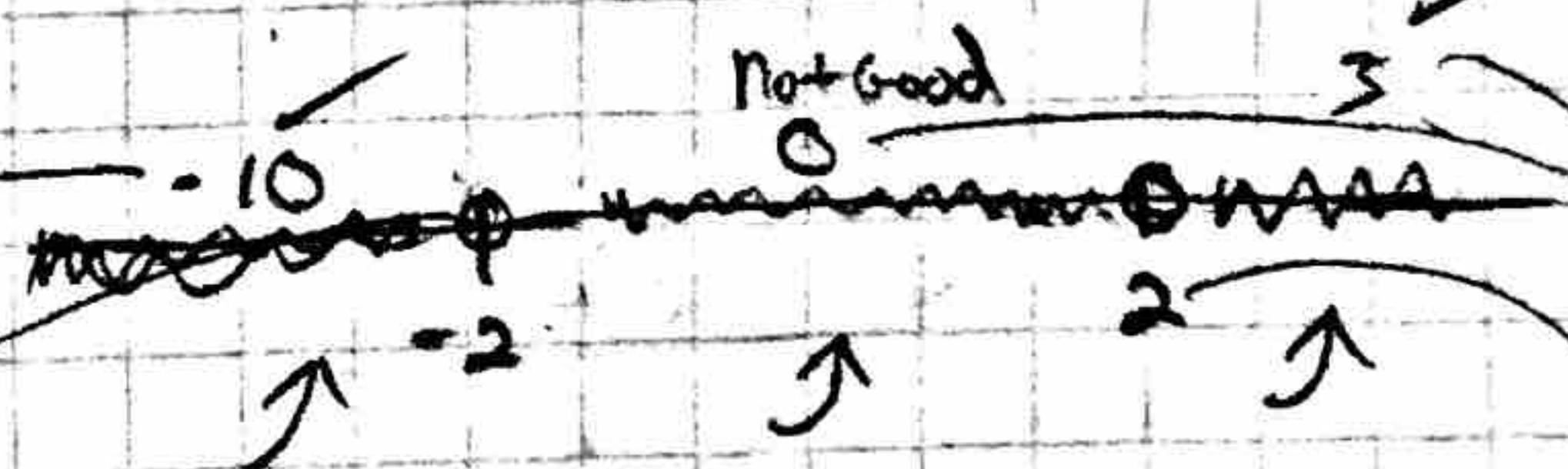
$$f(x) = \frac{1}{\sqrt{x^2-4}}$$

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

Requirement has to be greater than 0 and not negative.

$$x^2-4 > 0$$

$$(x+2)(x-2) > 0$$



check a number from each of the 3 intervals to see if they satisfy the equation

$$\boxed{\text{Domain: } (-\infty, 2) \cup (2, \infty)}$$

$$0 > 0 \text{ FALSE}$$

$$\begin{array}{l} (-2+2)(-2-2) \\ (0)(-4) = 0 \end{array}$$

$$\begin{array}{l} (-10+2)(-10-2) \\ (-8)(-12) = 96 \end{array} \quad \begin{array}{l} \text{Positive \#} \\ \text{is good} \end{array}$$

$$\begin{array}{l} (2+2)(2-2) \\ (4)(0) = 0 \end{array}$$

$$\begin{array}{l} (0+2)(0-2) \\ (2)(-2) = -4 \end{array}$$

$$\begin{array}{l} (3+2)(3-2) \\ (5)(1) \end{array}$$

$$\text{" } \textcircled{6}$$

$$f(x) = \ln(\underbrace{x-8}_{>0})$$

Any within a natural logarithm has to be greater than 0.

$$\begin{array}{r} x - 8 > 0 \\ +8 \quad +8 \\ \hline x > 8 \end{array}$$

$$\boxed{\text{Domain: } (8, \infty)}$$

$$f(x)$$

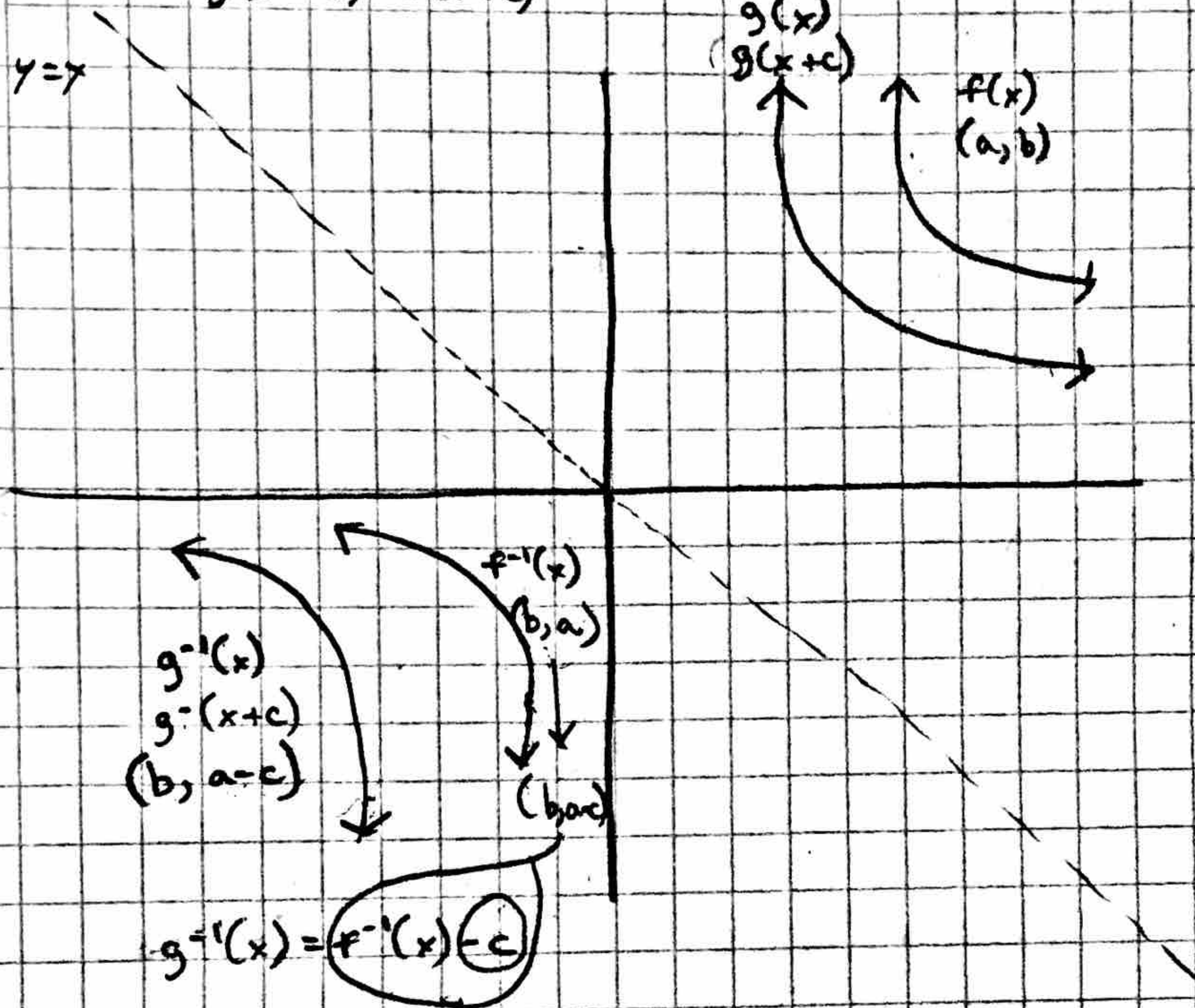
$$g(x)$$

$$g(x) = f(x+c)$$

$$g(x+c) = f(x+c)$$

$$g^{-1}(x) = ?$$

$$g^{-1}(x) = f^{-1}(x) - c$$



Putting It
Together