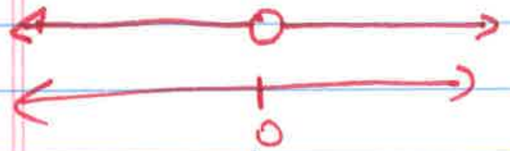
1.3 Domain of function

Interval where the function is defined

3 cases: Let $f(x) = \frac{1}{x}$



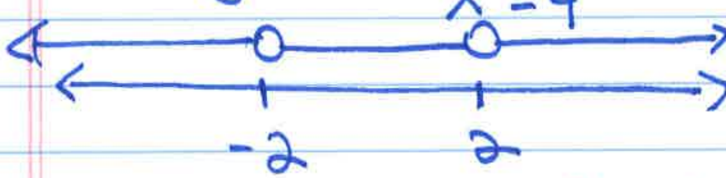
$x \neq 0$ $(-\infty, 0) \cup (0, \infty)$

You are not allowed to divide by zero

that is the denominator should not be zero

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

$x^2 - 4 \neq 0$



$x^2 \neq 4$

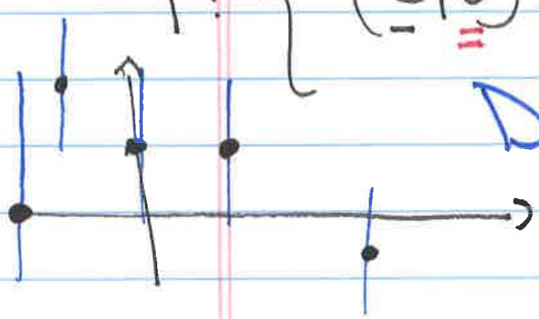
$|x| \neq 2$

Domain: $(-\infty, -2) \cup (-2, 2) \cup (2, \infty)$ $x \neq \pm 2$

infinity

$h(x) = -3x^2 + 4x + 5$ $D_h: (-\infty, \infty)$ Range $(-\infty, \frac{19}{3})$

$f: \{(-3, 0), (-1, 4), (0, 2), (2, 2), (4, -1)\}$



$D_f = \{-3, -1, 0, 2, 4\}$ function

Range $= \{0, 4, 2, -1\}$

$h(x) = \dfrac{1}{x+5}$ $\quad x+5 \neq 0$

$x \neq -5$ ($x=-5$ Vertical Asymptote

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

Range $(-\infty,0) \cup (0,\infty)$

$y=0$ horizontal Asymptote

$y=\sqrt{x}$ Inside a Square Root the Quantity Should be always positive

Domain $x \geq 0$; $[0,\infty)$

Range: $y \geq 0$ $\therefore$ $[0,\infty)$

Examples: Find the domain of the function

$f(x) = \sqrt{x-6}$ $\quad x-6 \geq 0 \therefore x \geq 6$

Domain $[6,\infty)$

$g(x) = \sqrt[3]{x-4}$ $\quad D_g: (-\infty,\infty)$

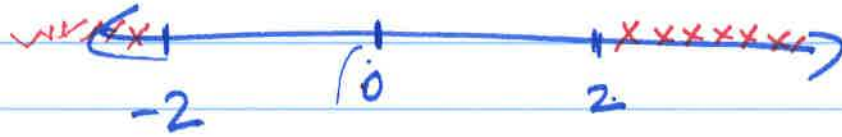
$h(x) = \sqrt{x^2-4}$

$x^2-4 \geq 0$

$D_h = (-\infty,-2] \cup [2,\infty)$

$x^2 \geq 4$

$|x| \geq 2$



$x \leq -2$ or $x \geq 2$

$g(x) = \dfrac{x+2}{\sqrt{x-10}}$

$\underbrace{x-10 \geq 0 \text{ and } x-10 \neq 0}$

$x-10 > 0$

$x > 10$

$D_g = (10,\infty)$

Quiz upto 1.3 focus on Domain range. graphs.