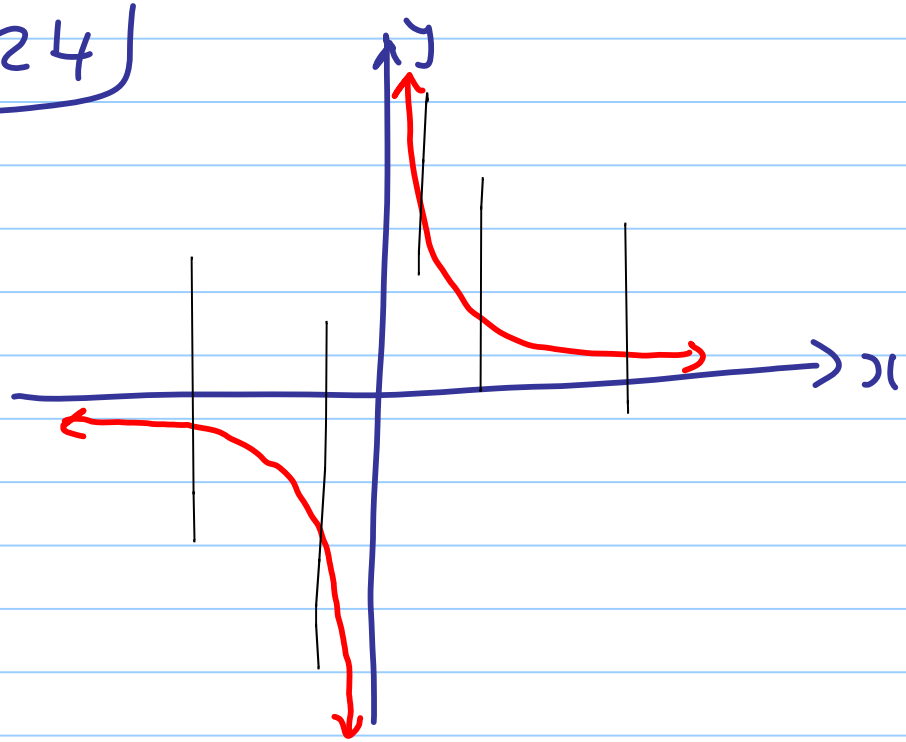
September 15, 2010

Note Title 9/15/2010

§3.1 # 24)



By the vertical line test . . . . . A function.

$y = 2t - 3$

$g(t) = 2t - 3$ $\quad$ $g(t)$ — g of t

— g evaluated at t

Example

$f(0) = 5$

c $f(1) = 2$

d) $f(2) = 1$

Find $4f(3)$. $\quad$ $4f(3) = 4(2) = 8$

e) $f(x) = 10$. What is x? $\boxed{x = 5}$

f) $f(x) = 2$. So $x = 1$ or $x = 3$.

Example

$f(x) = x^2 - 3x$

$f(x+1) = (x+1)^2 - 3(x+1)$

$= x^2 + 2x + 1 - 3x - 3$

$= x^2 - x - 2$

$f(x+1) \neq f(x) + 1$

Example

$H(x) = x^2 + 2x$

a) $H(x+1) = (x+1)^2 + 2(x+1)$

$= x^2 + 2x + 1 + 2x + 2$

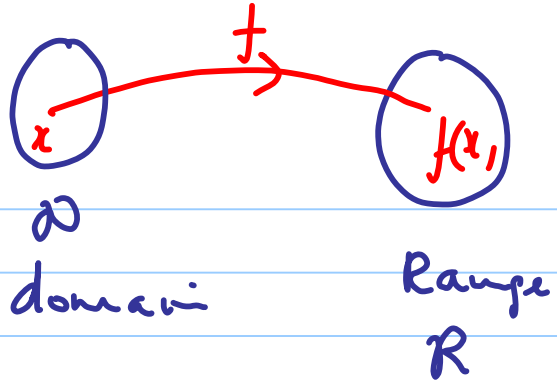
$= x^2 + 4x + 3$

b) $H(x) + H(1) = \underbrace{x^2 + 2x}_{H(x)} + \underbrace{1^2 + 2(1)}_{H(1)}$

$= x^2 + 2x + 3$

Observation: $H(x+1) \neq H(x) + H(1)$

Domain



Examples

State the domain of the given functions

a) $F(x) = \dfrac{3}{x^2-25}$

$x^2 - 25 \neq 0$

$x \neq \pm 5$ So the domain is

$D = \{$ all real numbers except $x = \pm 5\}$

$= \{x \in \mathbb{R} \mid x \neq \pm 5\}$

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

b) $H(x) = \sqrt[4]{9-2x}$

$$\sqrt[n]{x^n} = \begin{cases} |x| & \text{if } n \text{ is even} \\ x & \text{if } n \text{ is odd} \end{cases}$$

Restriction on x:

$$9 - 2x \geq 0$$

$$9 \geq 2x$$

$$\frac{9}{2} \geq x$$

Domain: $\left(-\infty, \frac{9}{2}\right]$

Example

c) $G(x) = \sqrt[3]{x-1}$

restriction on x : None

domain $(-\infty, \infty)$.