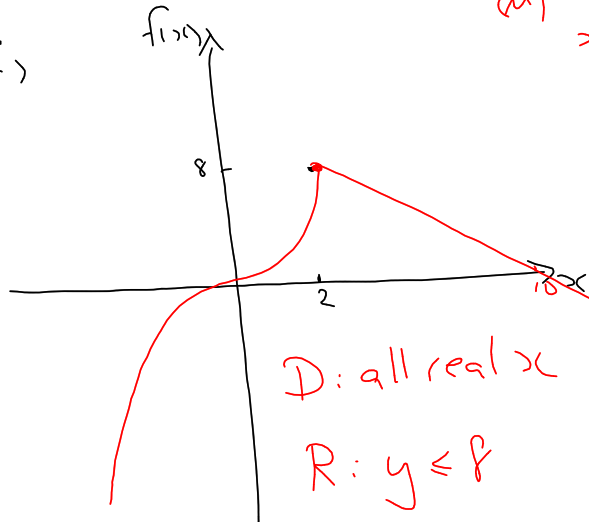


$$4a) f(x) = \begin{cases} x^3, & x \leq 2 \\ 10-x, & x > 2 \end{cases}$$

(i)



$$(ii) \lim_{x \rightarrow 2^-} f(x) = 8$$

$$\lim_{x \rightarrow 2^+} f(x) = 8$$

$$f(2) = 2^3 = 8$$

(iii) continuous at $x=2$

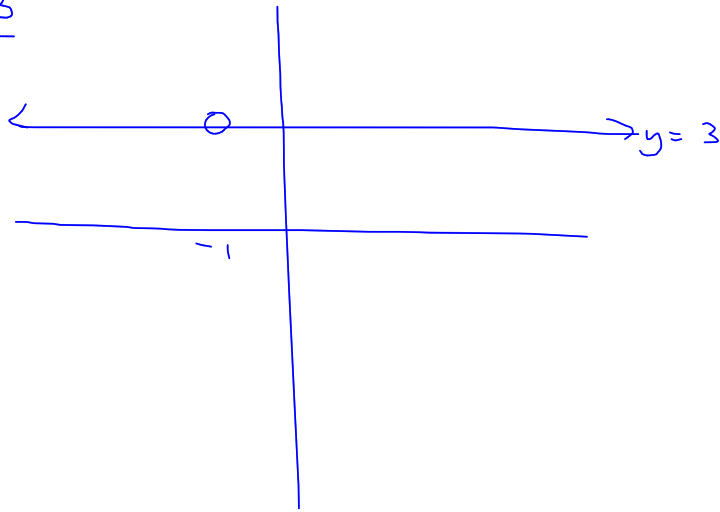
D : all real x

R : $y \leq 8$

Sd,

$$y = \frac{3x+3}{x+1}$$

$$= 3$$



$$8a) \quad f(x) = \begin{cases} ax^2, & x \leq 1 \\ 6-x, & x > 1 \end{cases}$$

$$at \ x=1$$

$$ax^2 = 6-x$$

$$a = 6-1$$

$$\underline{a=5}$$

$$9a) \quad y = \frac{x}{x-3}$$

zeros occur when $y=0$

$$\frac{x}{x-3} = 0$$

$$\underline{x = 0.}$$

$$y = \frac{x}{x-3}$$

$$= 1 + \frac{3}{x-3}$$

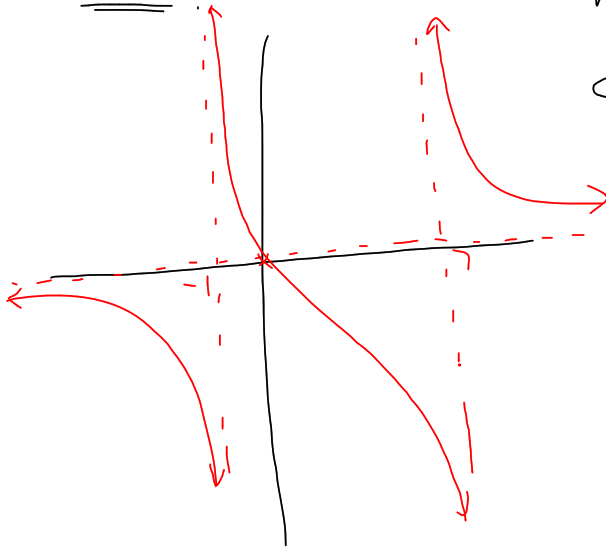
Vertical asymptote: $x = 3$

horizontal asymptote: $y = 1$

9b) $y = \frac{x}{x^2 - 6x - 7}$

zeros occur at $y=0$

$x=0$



$$y = \frac{0 + \frac{x}{(x-7)(x+1)}}{x}$$

vertical asymptote: $x = -1, x = 7$

horizontal asymptote: $y = 0$

discontinuities at $x = -1, x = 7$

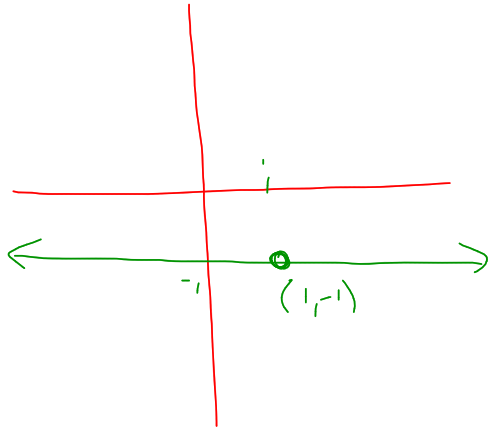
$$\lim_{x \rightarrow \infty} \frac{x}{x^2 - 6x - 7}$$

$$= \frac{0}{1}$$

$$= 0$$

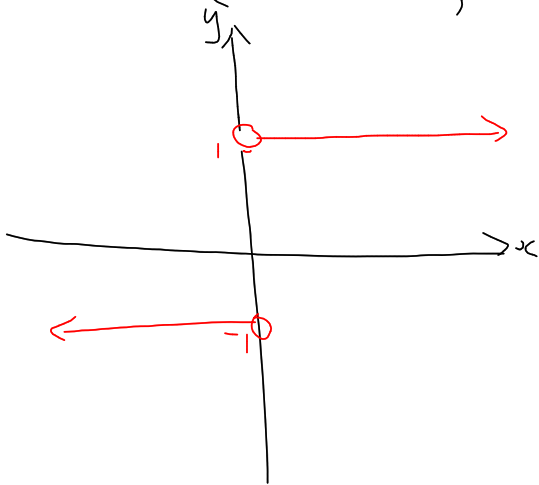
$$y = \frac{1-x}{x-1}$$

$$= -1$$



(0a) $y = \frac{|x|}{x}$

$$= \begin{cases} \frac{x}{x} = 1, & x \geq 0 \\ -\frac{x}{x} = -1, & x < 0 \end{cases}$$



$$|a| = \begin{cases} a, & a \geq 0 \\ -a, & a < 0 \end{cases}$$

$\lim_{x \rightarrow 0^+} = 1$
 $\lim_{x \rightarrow 0^-} = -1$
 $y(0)$ is undefined
 discontinuous at $x=0$