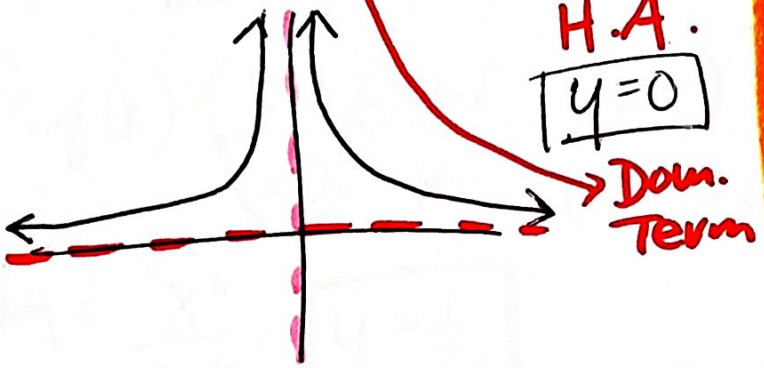
p. 148

(17) $f(x) = \frac{1}{x^2}$ ← x^2

V.A. $x = 0$

H.A. $y = 0$

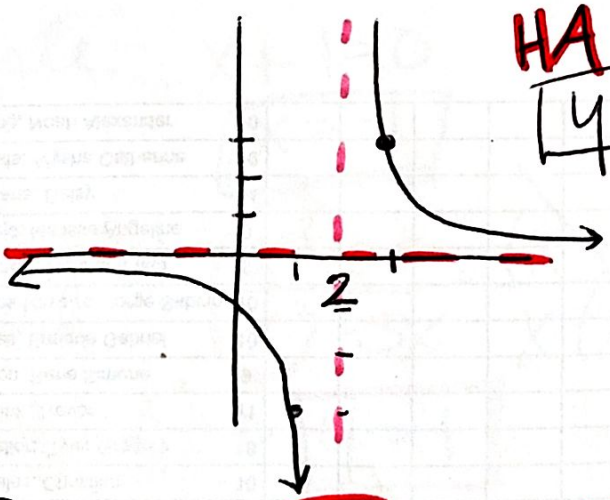


(18) $f(x) = \frac{3}{(x-2)^3}$

$x - 2 = 0$

VA $x = 2$

HA $y = 0$



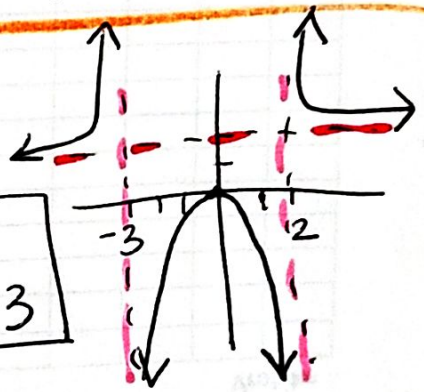
(19) $f(x) = \frac{2x^2}{x^2 + x - 6}$

$= \frac{2x^2}{(x-2)(x+3)}$

HA $\frac{2x^2}{x^2}$

$y = 2$

VA $x = 2$, $x = -3$



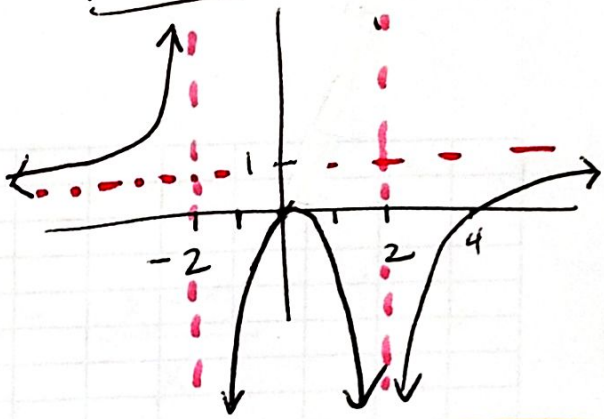
(20) $f(x) = \frac{x^2 - 4x}{x^2 - 4}$

H.A. $y = \frac{x^2}{x^2}$

$y = 1$

VA $(x+2)(x-2)$

$x = -2$ $x = 2$



(21) $f(x) = \frac{x(2+x)}{2x-x^2} = \frac{x(x+2)}{x(2-x)} = \frac{x+2}{(2-x)}$

HA: $\frac{x^2}{-x^2} \Rightarrow \boxed{y=-1}$

VA: $2-x=0$

$\boxed{x=2}$

Hole: $\boxed{x=0}$

(22) $f(x) = \frac{x^2+2x+1}{2x^2-x-3} = \frac{(x+1)(x+1)}{(2x-3)(x+1)} = \frac{x+1}{2x-3}$

HA: $\frac{x^2}{2x^2} \Rightarrow \boxed{y=\frac{1}{2}}$

VA: $2x-3=0$ $\boxed{x=\frac{3}{2}}$

Hole $x+1=0$

$\boxed{x=-1}$

(23) $f(x) = \frac{x^2-25}{x^2+5x} = \frac{(x+5)(x-5)}{x(x+5)} = \frac{x-5}{x}$

HA: $\frac{x^2}{x^2} \Rightarrow \boxed{y=1}$

VA: $\boxed{x=0}$

Hole: $x+5=0$

$\boxed{x=-5}$

(24) $f(x) = \dfrac{3-14x-5x^2}{3+7x+2x^2} = \dfrac{-1(5x^2+14x-3)}{2x^2+7x+3}$ (D 10)

$$\frac{-1(5x-1)(x+3)}{(2x+1)(x+3)} = \frac{-5x+1}{2x+1}$$

HA $= \dfrac{-5x^2}{2x^2} \Rightarrow y = -\dfrac{5}{2}$

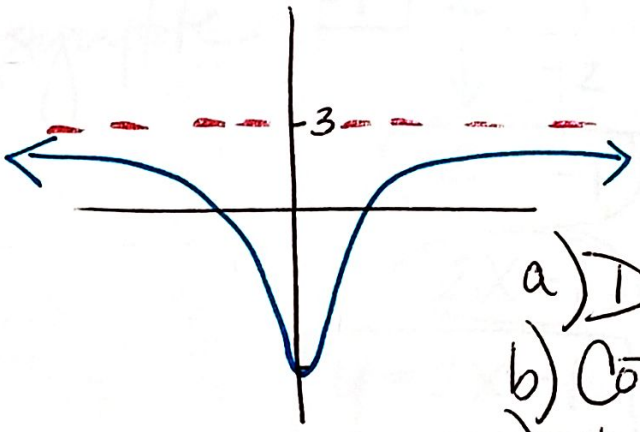
VA $\Rightarrow 2x+1=0$

$x = -\dfrac{1}{2}$

Holes $x+3=0$

$x=-3$

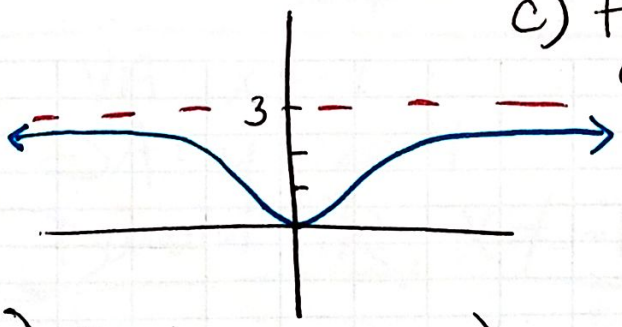
(25) $f(x) = \dfrac{3x^2+x-5}{x^2+1}$



HA $\Rightarrow \dfrac{3x^2}{x^2} \Rightarrow y=3$

a) Domain: $\mathbb{R}$
b) Continuous
c) Horiz. Asymp at $y=3$

(26) $f(x) = \dfrac{3x^2+1}{x^2+x+9}$



a) Domain: $\mathbb{R}$ b) Continuous c) HA: $\dfrac{3x^2}{x^2} \Rightarrow y=3$

p.158 #58, 59, 61, 64, 65, 68, 84

(58) $\dfrac{0}{1} = \dfrac{2x}{x-3}$ $\quad y = \dfrac{2(0)}{0-3} = \dfrac{0}{-3}$ $\quad y=0$

$2x=0 \quad x=0 \rightarrow (0,0)$

(59) $y = \frac{1}{x} - x$

(D10)

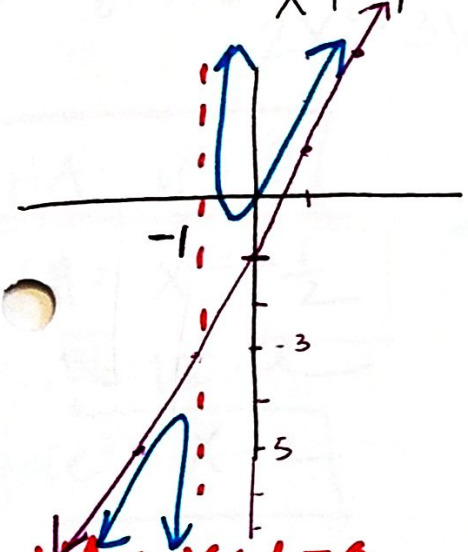
- $x(0) = \left(\frac{1}{x} - x\right)x$

$0 = 1 - x^2$

$\sqrt{x^2} = \sqrt{1}$

$x = \pm 1$ $\quad (1,0)$ $\quad (-1,0)$

(61) $y = \frac{2x^2 + x}{x+1}$



VA: $x+1=0$

$x = -1$

Slant Asymptote

$-1 \mid 2 \quad 1 \quad 0$

$\downarrow \quad -2 \quad 1$

$2 \quad -1 \quad 1$

$2x - 1 + \frac{1}{x+1}$

$y = 2x - 1$

VA: $x = -1$

SA: $y = 2x - 1$

Domain: $\mathbb{R}, x \neq -1$

(64) $f(x) = \frac{12 - 2x - x^2}{2(4+x)} = -\frac{(x^2 - 2x + 12)}{2x+8}$

$-\frac{1}{2}x + 1 + \frac{4}{2x+8}$

$2x+8 \;\big)\; -x^2 - 2x + 12$

$+x^2 + 4x$

$2x + 12$

$2x + 8$

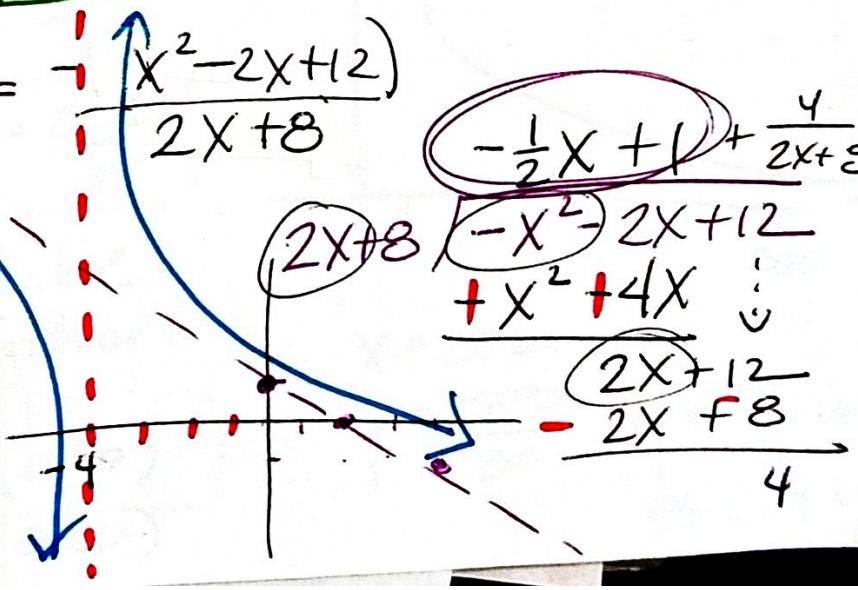
4

VA $\Rightarrow x + 4 = 0$

$x = -4$

SA $y = -\frac{1}{2}x + 1$

Domain: $\mathbb{R}, x \neq -4$



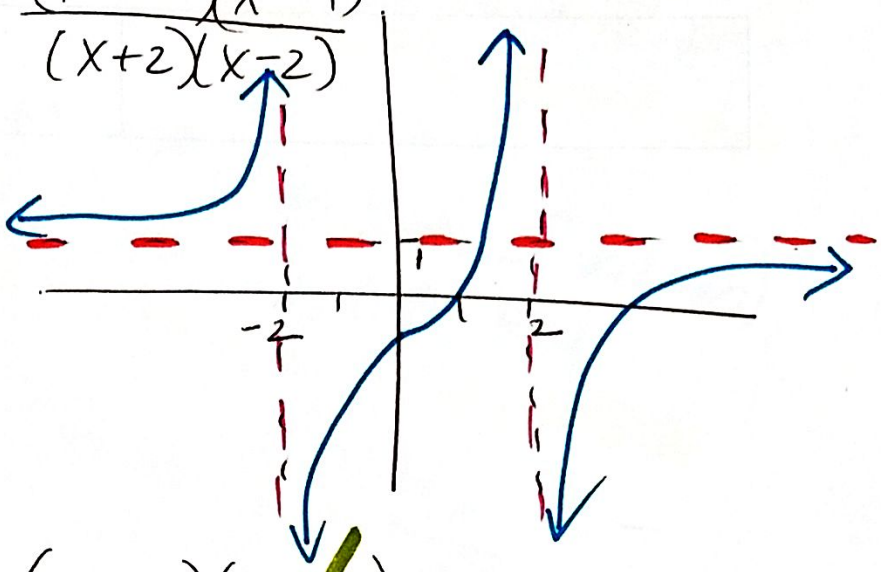
(5) $f(x) = \dfrac{x^2-5x+4}{x^2-4} = \dfrac{(x-1)(x-4)}{(x+2)(x-2)}$

HA: $\dfrac{x^2}{x^2} \Rightarrow$ $y=1$

VA: $x=-2, x=2$

SA: none

Holes: none



(68) $f(x) = \dfrac{3x^2-8x+4}{2x^2-3x-2} = \dfrac{(3x-2)(x-2)}{(2x+1)(x-2)} = \dfrac{3x-2}{2x+1}$

$2x+1=0$

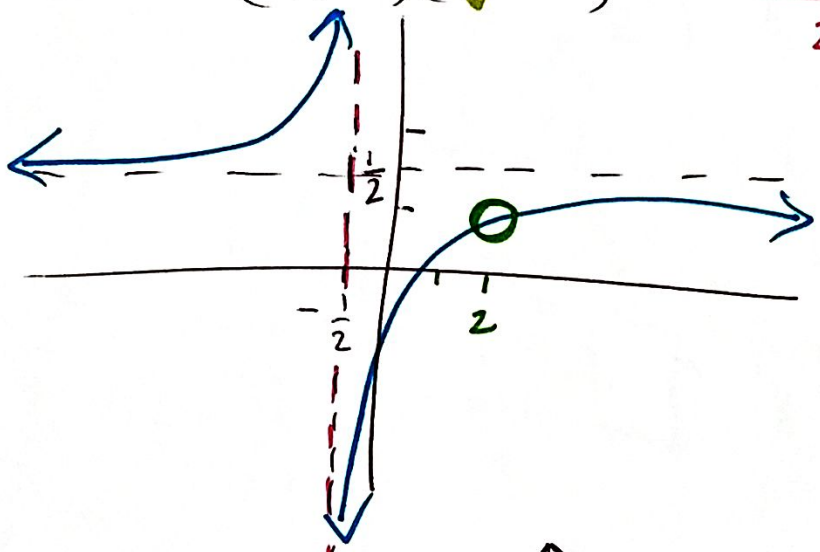
$x=-\frac{1}{2}$

HA: $y=\frac{3}{2}$

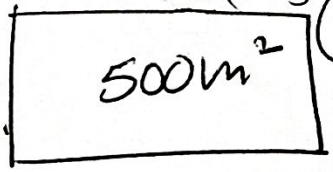
VA: $x=-\frac{1}{2}$

SA: none

Hole: $x=2$



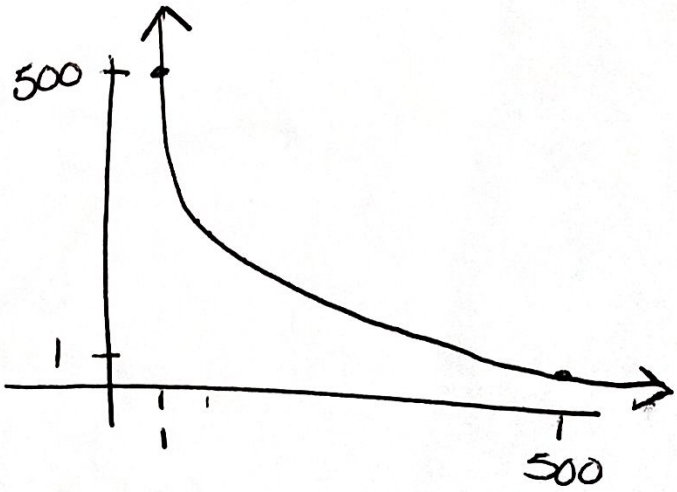
(34) a)



$\dfrac{xy}{x} = \dfrac{500}{x}$

$y = \dfrac{500}{x}$

c)



b) Since there can be no negative length or width!

D: $x>0$ $(0,\infty)$

R: $y>0$ $(0,\infty)$

$x = 30\text{m}$

$y = \dfrac{500}{30}$

$y = \dfrac{50}{3}\text{m}$ or $16\frac{2}{3}\text{m}$