HW 7.4

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R.F. = Reciprocal Function
V.A. = Vertical Asymptotes
I.P. = Invariant points

1. a) R.F.: $\frac{1}{3x-5}$ V.A.: $x = 5/3$

I.P.: $(2,7)$ $(4/3,-1)$

Domain: $\{x \mid x \neq 5/3, x \in \mathbb{R}\}$ Range: $\{y \mid y \neq 0, y \in \mathbb{R}\}$

b) R.F. $\frac{1}{-\frac{3}{2}x+8}$ V.A.: $x = \frac{16}{3}$ I.P.: $(14/3, 1)$ $(6,-1)$

Domain: $\{x \mid x \neq \frac{16}{3}, x \in \mathbb{R}\}$ Range: $\{y \mid y \neq 0, y \in \mathbb{R}\}$

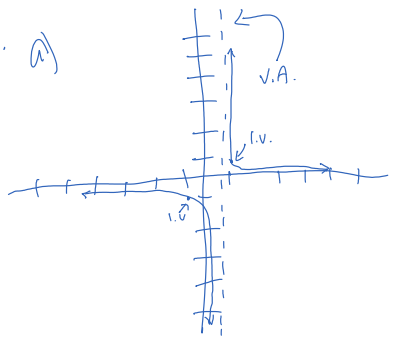
c) R.F.: $\frac{1}{x^2-5}$ V.A.: $x = \pm\sqrt{5}$ I.P: $(-\sqrt{6},1)$ $(\sqrt{6},1)$ $(2,-1)$ $(-2,-1)$

Domain: $\{x \mid x \neq \pm\sqrt{5}, x \in \mathbb{R}\}$ Range: $\{y \mid y > 0, y \leq -\frac{1}{5}, y \in \mathbb{R}\}$

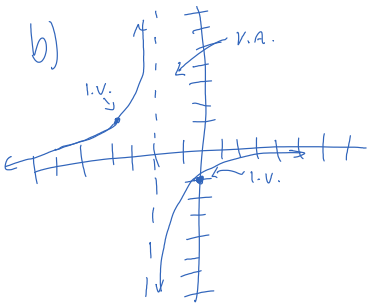
d) R.F.: $\frac{1}{(x-3)^2-4}$ V.A.: $x = 5$, $x = 1$ I.P.: $(3+\sqrt{5},1)$ $(3-\sqrt{5},1)$ $(3+\sqrt{3},-1)$ $(3-\sqrt{3},-1)$

Domain: $\{x \mid x \neq 5, x \neq 1, x \in \mathbb{R}\}$ Range: $\{y \mid y > 0, y < \frac{1}{4}, y \in \mathbb{R}\}$

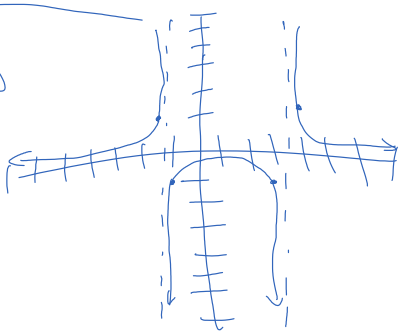
2. a)



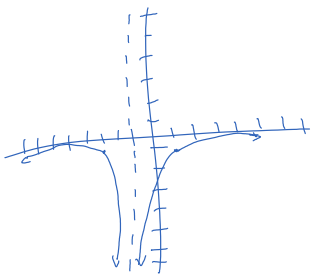
b)



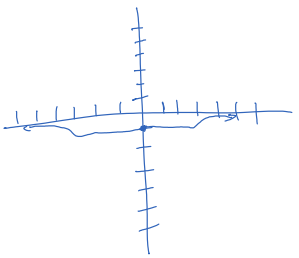
c)



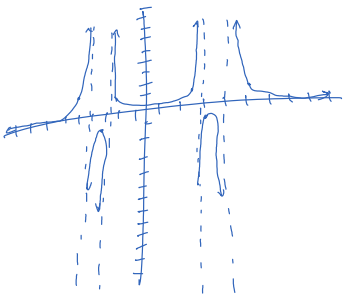
d)



e)



f)



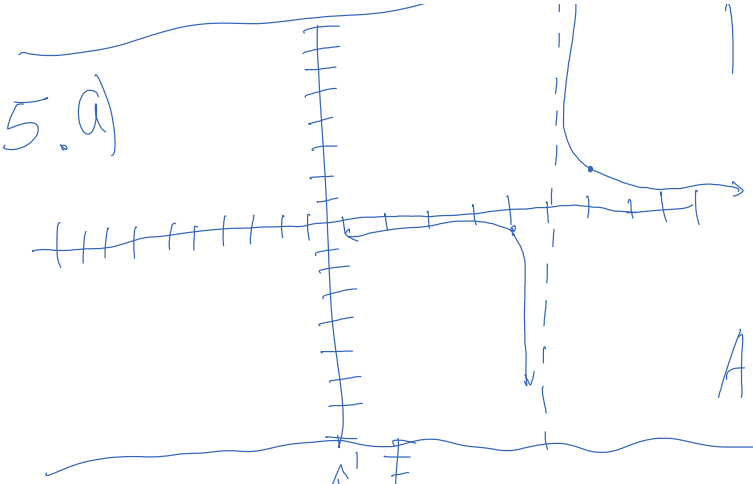
3. a) $y = \frac{1}{3x-5}$ b) $y = \frac{3}{2x-1}$ c) $y = \frac{5x-1}{3x-5}$ d) $y = \frac{1}{3x^2+4}$ e) $y = \frac{1}{3}$

f) undefined g) $y = \frac{1}{-5x^2-6}$ h) $y = \frac{1}{5x^3-7x^2+22-6x}$

4. $(3, \frac{1}{5})$, $(-3, -\frac{1}{7})$, $(-2, \frac{1}{8})$, $(7, -\frac{1}{10})$, $(-3, -\frac{1}{9})$

I.P.: $(5,-1)$ $(7,1)$

5. a)



I.P.: $(5,-1)(7,1)$

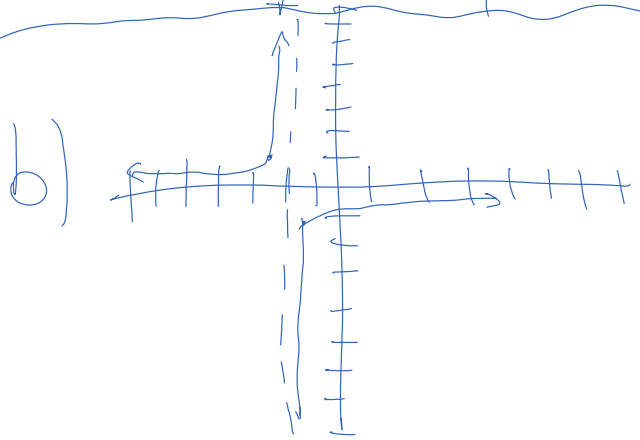
Domain: $\{x \mid x \neq 6, x \in \mathbb{R}\}$

Range: $\{y \mid y \neq 0, y \in \mathbb{R}\}$

Asymptotes: $x = 6$

$y = 0$

b)



I.P.: $\left(\frac{-5}{4}, 1\right)\left(-\frac{3}{2}, -1\right)$

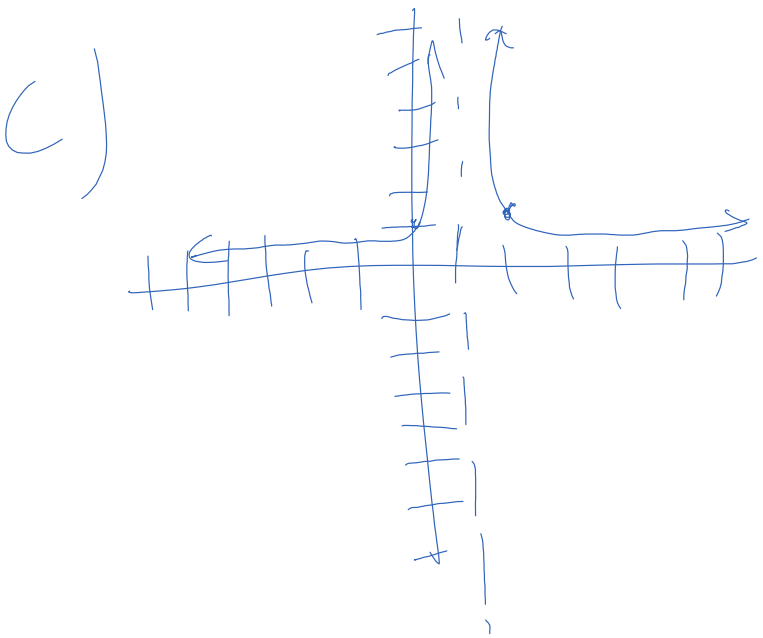
Domain: $\{x \mid x \neq -2, x \in \mathbb{R}\}$

Range: $\{y \mid y \neq 0, y \in \mathbb{R}\}$

Asymptotes: $x = -2$

$y = 0$

c)



I.P. $(0,2), (2,1)$

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

Range: $\{y \mid y > 0\}$