Translations of Simple Rational Functions

Graph the vertical asymptote at $x = h$

Graph the horizontal asymptote at $y = k$

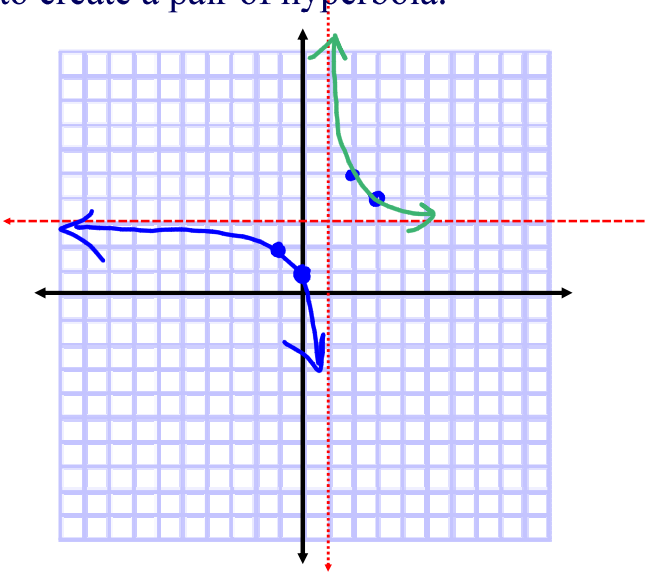
$$y = \frac{a}{x - h} + k$$

Plot two clear points to the left of the asymptote and two clear points to the right.

Connect the pairs of points to create a pair of hyperbola.

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

x	y
3	4
2	5
0	1
-1	2

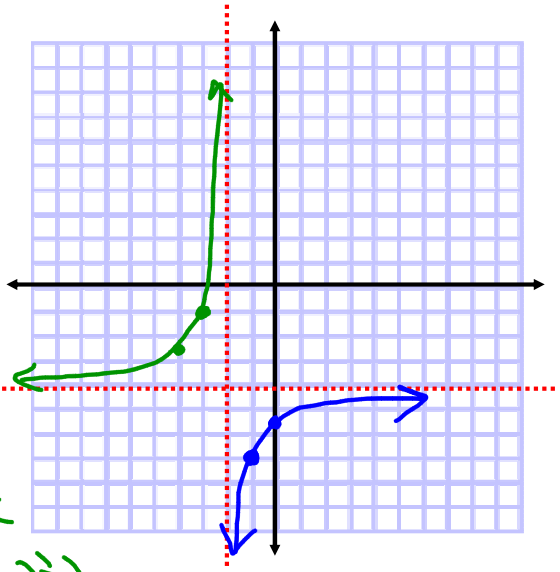


$$f(x) = \frac{-3}{x + 2} - 4$$

VA: $x = -2$

HA: $y = -4$

x	y
-3	$\frac{-3}{-3+2} - 4 = -1$ $(-3, -1)$
-4	$\frac{-3}{-4+2} - 4 = 1\frac{1}{2} - 4 = -2\frac{1}{2}$ $(-4, -2\frac{1}{2})$
-1	$\frac{-3}{-1+2} - 4 = -7$ $(-1, -7)$
0	$\frac{-3}{0+2} - 4 = -1\frac{1}{2} - 4 = -5\frac{1}{2}$ $(0, -5\frac{1}{2})$

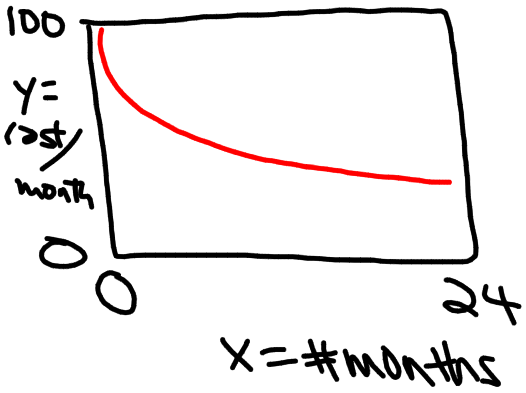


p561/#11,20,25,26,37,38

37. **INTERNET SERVICE** An Internet service provider charges a $50 installation fee and a monthly fee of $43. Write and graph an equation that gives the average cost per month as a function of the number of months of service. After how many months will the average cost be $53?

$X = \#\text{months}$

$$Y = \frac{50+43x}{x} = \frac{50}{x} + \frac{43x}{x} = \frac{50}{x} + 43$$



Month 5 → Cost $53/month