1. Solve.

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

$(x+3)(x+2)$ $(x+2)(x+3)$

$x^2 - 4 - (x^2+5x+6) = 3x+9$

$x^2 - 4 - x^2 - 5x - 6 = 3x+9$

$-5x - 10 = 3x + 9$

$-10 = 8x + 9$

$-19 = 8x$

$x = -19/8$

2. Find all x-intercepts, Holes and equations of VA, if any:

$$y = \frac{2x^4 + 6x^3 - 50x^2 - 150x}{4x^2 + 28x + 40}$$

$= \frac{2x(x^3+3x^2-25x-75)}{4(x^2+7x+10)} = \frac{2x(x-5)(x+5)(x+3)}{4(x+5)(x+2)}$

x-int: $x = 0, +5, -3$

Holes: $x = -5$

Eq of VA: $x = -2$

3. For each rational function find all y-intercepts and equations of HA, if any.

a) $y = \frac{7x^3 + 8x^2 - 4}{5x^3 - 8x^2 + 2x}$

y-int: $\frac{-4}{0}$ Noyint

Eq of HA: $y = 7/5$

b) $y = \frac{6x^2 - 9x + 13}{12x^3 + 8x^2 - 3}$

y-int: $y = 13/-3$

Eq of HA: $y = 0$

4. Simplify. State restrictions on the variable.

$$\frac{10x^3 + 30x^2}{x^2 - x - 20} \div \frac{6x^3 + 6x^2 - 36x}{x^3 - 5x^2 - 16x + 80}$$

Answer: $\frac{5x(x-4)}{3(x-2)}$

$$\frac{10x^2(x+3)}{(x-5)(x+4)} \cdot \frac{x^3 - 5x^2 - 16x + 80}{6x^3 + 6x^2 - 36x} \cdot \frac{(x+4)(x-4)(x-5)}{6x(x-2)(x+3)}$$

Restrictions: $x \neq 5, -4, 0, 2, -3$

Extraneous Solutions

Solve.

$$\frac{-4}{5x+10} = \frac{2}{x+2}$$

x = -2 is an extraneous solution because it makes the equation undefined!

Steps to follow when solving equations

1. Blah, Blah, Blah

2. Blah, Blah, Blah

•
•
•

Last Step: Check your answers

Solve.

$$\frac{x}{x+4} + \frac{7}{x-1} = \frac{x+34}{x^2+3x-4}$$

$x = -6$

$(x-1)\frac{x}{(x-1)x+4} + \frac{7(x+4)}{x-1(x+4)(x-1)(x+4)} = \frac{x+34}{}$

-4, -1, 4, 3

$x(x-1) + 7(x+4) = x+34$

$x^2 - x + 7x + 28 = x+34$

$x^2 + 6x + 28 = x + 34$

$-x \quad -34 \quad -x \quad -34$

$x^2 + 5x - 6 = 0$

-6, 1, -6, -5

$(x-1)(x+6) = 0$

$x = +1, -6$

1. Graph this equation. Show asymptotes as dashed lines. State the equations of the asymptotes.

Chapter 9 Review

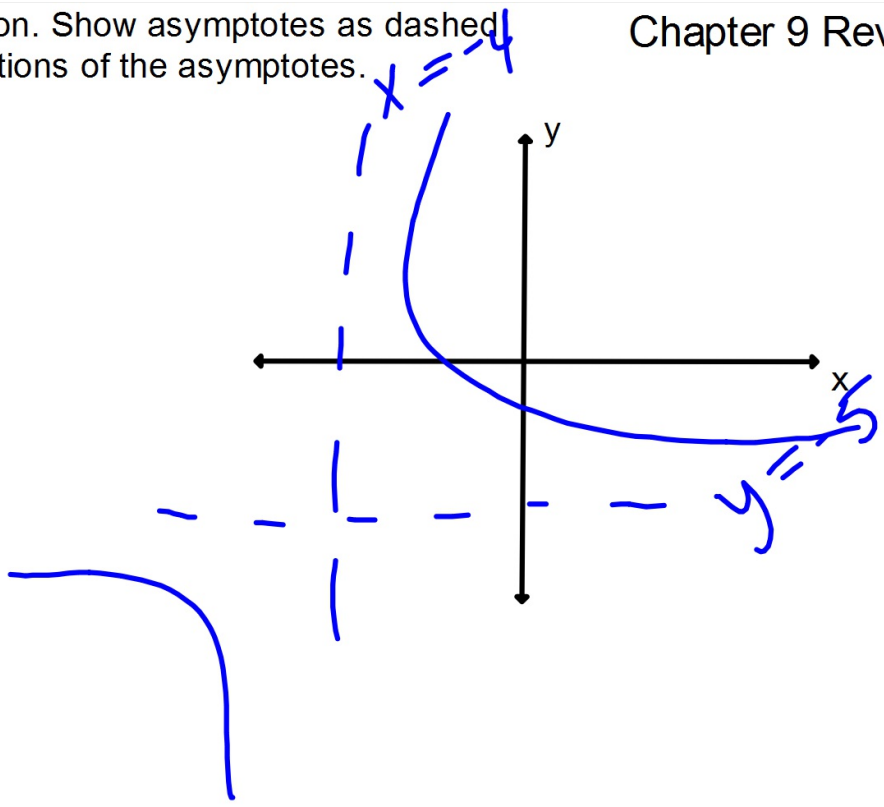
$$y = \frac{52}{x+4} - 5$$

Eq of HA:

$y = -5$

Eq of VA:

$x = -4$



2. Find the exact solution to each.

a) $\left(\frac{x+3}{8x} - \frac{5}{6}\right) = \left(\frac{2x-1}{3x}\right)$ $24x$

$24x$

$3(x+3) - 4x(5) = 8(2x-1)$

$3x+9-20x = 16x-8$

$-17x+9 = 16x-8$

$9 = 33x-8$

$17 = 33x$ $\quad x = \frac{17}{33}$

b) $\frac{x}{3x+10} = \frac{-2}{2x+7}$

$2x^2+7x = -6x-20$

$+6x \quad +6x$

$2x^2+13x = -20$

$+20 \quad +20$

$2x^2+13x+20=0$

$2x+5=0$

40

8 5

13

	x	4
$2x$	$2x^2$	$8x$
5	$5x$	20

$(2x+5)(x+4)$

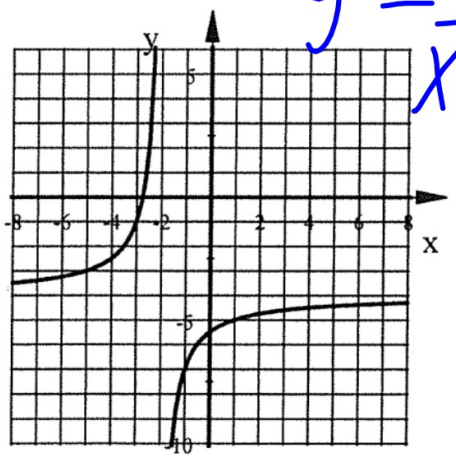
$x = -5/2, -4$

Chapter 9 Review Questions

14. Each graph is a translation of the function $y = \frac{3}{x}$. Write the equation of each.

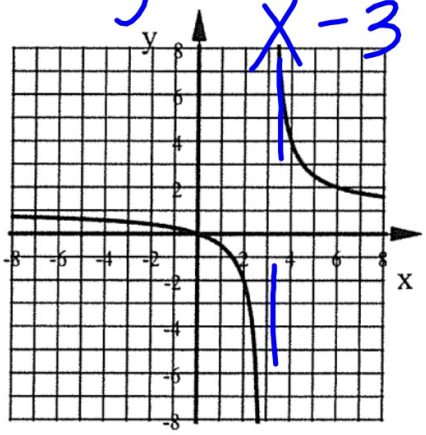
$y = \frac{-3}{x+2} - 4$

a)



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

b)



Simplify each.

6. $\dfrac{\left(\frac{6}{x^3} + 1\right)}{\left(\frac{4}{y^2}\right)} \times 3y^2$