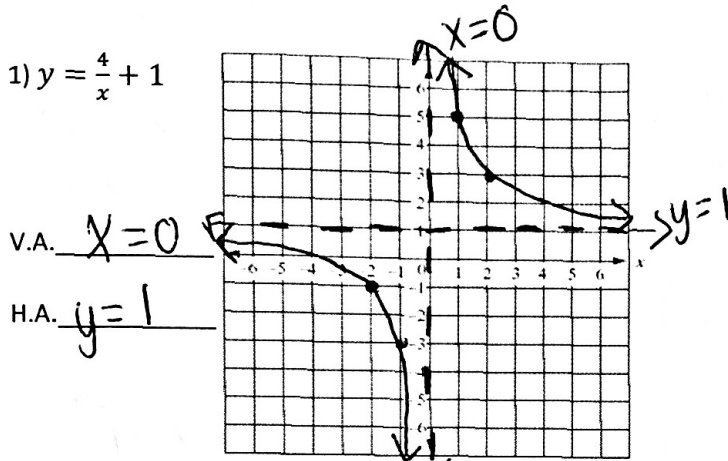


Graphing, Multiplying, and Dividing Rational Expressions
(8.2, 8.4) Review

Name: Key
Advanced Algebra with Trigonometry, Glawe

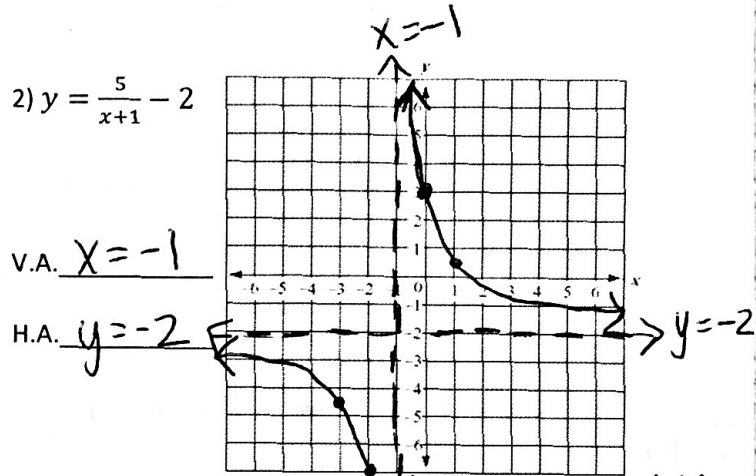
Sketch the asymptotes and graph the rational function. Identify the vertical asymptote and horizontal asymptote, and state the domain/range. Plot a *minimum* of two points on each branch.



Domain: $(-\infty, 0) \cup (0, \infty)$
Range: $(-\infty, 1) \cup (1, \infty)$

x	y
-2	-1
-1	-3
1	5
2	3

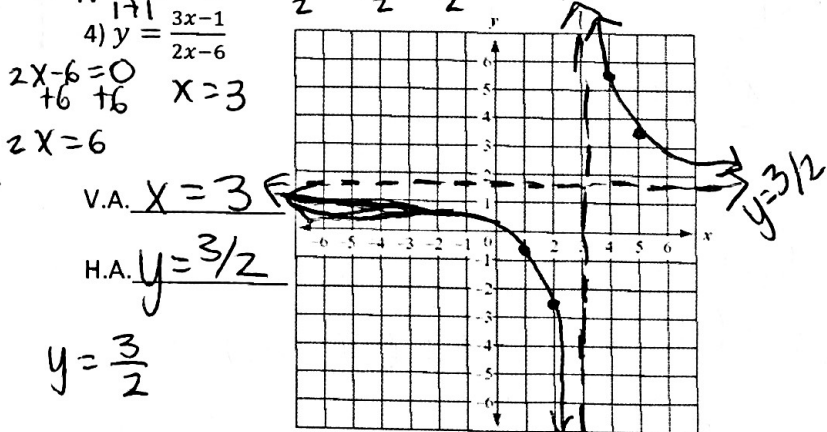
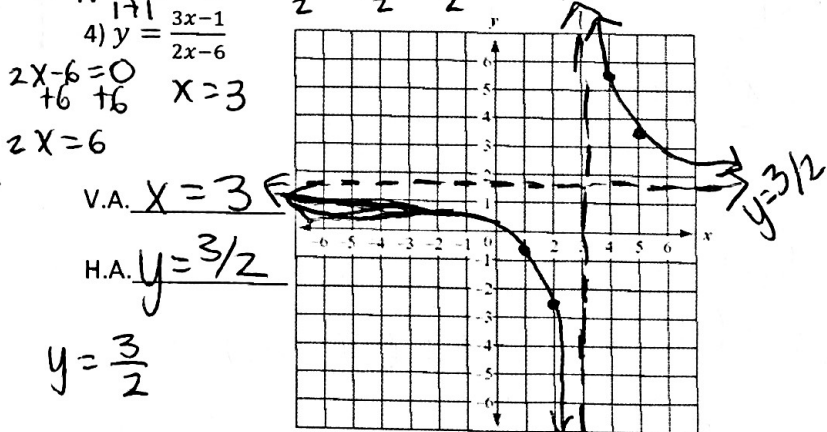
$x = -2: y = \frac{4}{-2} + 1 = -2 + 1 = -1$
 $x = -1: y = \frac{4}{-1} + 1 = -4 + 1 = -3$
 $x = 1: y = \frac{4}{1} + 1 = 4 + 1 = 5$
 $x = 2: y = \frac{4}{2} + 1 = 2 + 1 = 3$



Domain: $(-\infty, -1) \cup (-1, \infty)$
Range: $(-\infty, -2) \cup (-2, \infty)$

x	y
-3	-9/2
-2	-7
0	3
1	1/2

$x = -3: \frac{5}{-3+1} - 2 = \frac{5}{-2} - 2 = -\frac{5}{2} - 2 = -\frac{9}{2}$
 $x = -2: \frac{5}{-2+1} - 2 = \frac{5}{-1} - 2 = -5 - 2 = -7$
 $x = 0: \frac{5}{0+1} - 2 = 5 - 2 = 3$
 $x = 1: \frac{5}{1+1} - 2 = \frac{5}{2} - 2 = \frac{1}{2}$



Domain: $(-\infty, -1) \cup (-1, \infty)$
Range: $(-\infty, 2) \cup (2, \infty)$

x	y
-3	13/4
-2	4/2
0	-1/2
1	3/4

$x = -3: \frac{4(-3)-1}{2(-3)+2} = \frac{-12-1}{-6+2} = \frac{-13}{-4} = \frac{13}{4}$
 $x = -2: \frac{4(-2)-1}{2(-2)+2} = \frac{-8-1}{-4+2} = \frac{-9}{-2} = \frac{9}{2}$
 $x = 0: \frac{4(0)-1}{2(0)+2} = \frac{-1}{2} = -\frac{1}{2}$
 $x = 1: \frac{4(1)-1}{2(1)+2} = \frac{4-1}{2+2} = \frac{3}{4}$

Domain: $(-\infty, 3) \cup (3, \infty)$
Range: $(-\infty, 3/2) \cup (3/2, \infty)$

x	y
1	-1/2
2	-5/2
4	11/2
5	7/2

$x = 1: \frac{3(1)-1}{2(1)-6} = \frac{3-1}{2-6} = \frac{2}{-4} = -\frac{1}{2}$
 $x = 2: \frac{3(2)-1}{2(2)-6} = \frac{6-1}{4-6} = \frac{5}{-2} = -\frac{5}{2}$
 $x = 4: \frac{3(4)-1}{2(4)-6} = \frac{12-1}{8-6} = \frac{11}{2}$
 $x = 5: \frac{3(5)-1}{2(5)-6} = \frac{15-1}{10-6} = \frac{14}{4} = \frac{7}{2}$

5) Write a rational function that has the asymptote of $y = 4$.

$$y = \frac{1}{x} (+4) \quad \text{OR} \quad y = \frac{4}{x+1}$$

this can be anything

leading coefficients must simplify to 4

$$y = \frac{4}{x+1}$$

this can be anything

6) Write a rational function that has the asymptote of $x = 6$.

$$y = \frac{1}{x-6}$$

opposite of h $[(x-6)=0; x=6]$

$$y = \frac{1}{2x-12}$$

this needs to simplify to $x=6$

$$2x-12=0 \rightarrow 2x=12 \rightarrow x=6$$

Perform the indicated operation and/or simplify.

7) $\frac{8x^3+27}{6x^2+7x-3}$ → sum of cubes → S.O.A.P

$$(a+b)^3 = (a+b)(a^2-ab+b^2)$$

8) $\frac{3x^4y}{4xy^3} \cdot \frac{8x^3y^2}{2x^4y^4} =$

a.c | b

6	-3	7
9	-2	

$$\frac{(2x+3)((2x)^2 - 2x(3) + 3^2)}{(6x^2+9x)(-2x-3)} =$$

$$\frac{(2x+3)(4x^2-6x+9)}{3x(2x+3)(-2x-3)} =$$

$$\frac{(2x+3)(4x^2-6x+9)}{(2x+3)(3x-1)} = \boxed{\frac{4x^2-6x+9}{3x-1}}$$

$$\frac{24x^7y^3}{8x^5y^7} = 3x^2y^{-4} =$$

a.c | b

3		
		9
	10	-1

$$\frac{3x^2}{y^4}$$

-30 | 19

6	-5
---	----

$$\frac{x^2+x-30}{x^2-5x} \div \frac{(x^2-36)}{1}$$

-3 | -2

-3	1
----	---

10) $\frac{x^2-2x-3}{2x-4} \cdot \frac{4x^2+18x-10}{x^2+6x+5}$ → GCF: 2

$$\frac{(x-3)(x+1)}{2(x-2)} \cdot \frac{2(2x^2+9x-5)}{(x+5)(x+1)} =$$

$$\frac{(x+6)(x-5)}{x(x-5)} \cdot \frac{1}{(x-6)(x+6)} =$$

$$\frac{(x-3)(x+1)}{2(x-2)} \cdot \frac{2(2x^2+10x)(-x-5)}{(x+5)(x+1)} =$$

$$\frac{(x+6)(x-5)}{x(x-5)(x-6)(x+6)} =$$

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

$$\frac{1}{x(x-6)} = \boxed{\frac{1}{x^2-6x}}$$

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

$$\frac{(x-3)(2x-1)}{(x-2)} = \frac{2x^2-6x-x+3}{x-2} = \boxed{\frac{2x^2-7x+3}{x-2}}$$