

Advanced Algebra with Trig  
Ch. 8 Study Guide

Name: *Key*  
Period:

1. Identify the asymptotes, domain and range of the following functions:

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

vertical  $x-4=0$   
 $x=4$   
horizontal  $y = \frac{3}{1}$   
 $y=3$

D:  $(-\infty, 4) \cup (4, \infty)$  R:  $(-\infty, 3) \cup (3, 4)$

b.  $y = \frac{-1}{x-4} - 1$

vertical  $x-4=0$   
 $x=4$   
horizontal  $y=-1$

D:  $(-\infty, 4) \cup (4, \infty)$   
R:  $(-\infty, -1) \cup (-1, \infty)$

c.  $y = \frac{-2}{3x-5}$

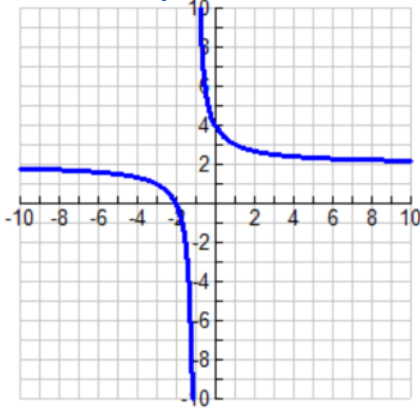
vertical  $3x-5=0$   
 $3x=5$   
 $x = \frac{5}{3}$   
horizontal  $y=0$

D:  $(-\infty, \frac{5}{3}) \cup (\frac{5}{3}, \infty)$   
R:  $(-\infty, 0) \cup (0, \infty)$

2. Match the function with its graph below.

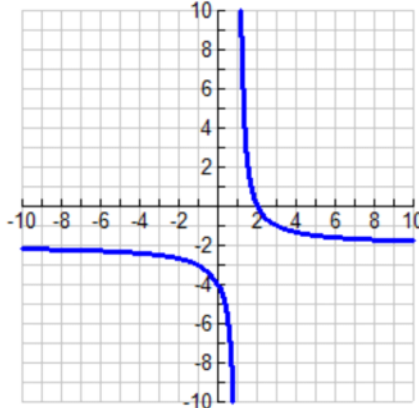
a.  $y = \frac{2}{x-1} + 2$  III

V:  $x=1$   
H:  $y=2$



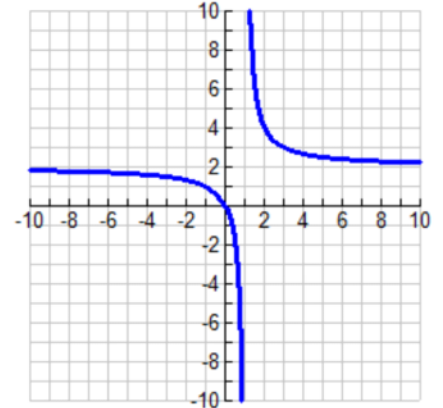
b.  $y = \frac{2}{x+1} + 2$  I

V:  $x=-1$   
H:  $y=2$



c.  $y = \frac{2}{x-1} - 2$  II

V:  $x=1$   
H:  $y=-2$



(3-10) Perform the indicated operation and simplify:

3.  $\frac{x^2-3x-4}{x^2-3x-18} \cdot \frac{x-6}{x+1}$

$\frac{(x-4)(x+1)}{(x-6)(x+3)} \cdot \frac{(x-6)}{(x+1)} = \frac{x-4}{x+3}$

4.  $\frac{4}{x-3} \div \frac{2}{x+6}$

$\frac{2 \cancel{4}}{x-3} \cdot \frac{x+6}{\cancel{2}} = \frac{2(x+6)}{(x-3)}$

5.  $\frac{4x^4+3x^3+2x+1}{x^2+x+2}$

$4x^2 - x - 7 + \frac{11x+15}{x^2+x+2}$

$x^2+x+2 \overline{) 4x^4+3x^3+0x^2+2x+1}$   
 $\underline{-(4x^4+4x^3+8x^2)}$   
 $-x^3-8x^2+2x$   
 $\underline{-(-x^3-x^2-2x)}$   
 $4x^2-x-7$

6.  $\frac{6x^3-19x^2+16x-4}{x^2-2}$

$6x^2 - 7x + 2$

$2 \overline{) 6} \quad -19 \quad 16 \quad -4$   
 $\dots$

$$4x^2 - x - 7 + \frac{11x+15}{x^2+x+2}$$

$$\begin{array}{r} -x^3 - 8x^2 + 2x \\ -(-x^3 - x^2 - 2x) \\ \hline -7x^2 + 4x + 1 \\ -(-7x^2 - 7x - 14) \\ \hline 11x + 15 \end{array}$$

$$\begin{array}{r|l} 2 & 6 & -19 & 16 & -4 \\ & 12 & -14 & & 4 \\ \hline & 6 & -7 & 2 & 0 \end{array}$$

7.  $\frac{2k^2+k-15}{k^2-9} - \frac{(2k-5)(k+3)}{(k+3)(k-3)}$

$$\frac{2k-5}{k-3}$$

8.  $\frac{3x}{x^2+x-12} - \frac{6}{x+4}$

$$\frac{3x}{(x+4)(x-3)} - \frac{6(x-3)}{(x+4)(x-3)}$$

$$\frac{3x - (6x - 18)}{(x+4)(x-3)}$$

$$\frac{-3x + 18}{(x+4)(x-3)} = \frac{-3(x-6)}{(x+4)(x-3)}$$

9.  $\frac{6-x}{x^2-2x-15} + \frac{3}{x-5}$

$$\frac{(6-x)}{(x-5)(x+3)} + \frac{3}{(x-5)} \cdot \frac{x+3}{x+3}$$

$$\frac{6-x + 3(x+3)}{(x-5)(x+3)}$$

$$\frac{6-x + 3x + 9}{(x-5)(x+3)} = \frac{2x+15}{(x-5)(x+3)}$$

10.  $\frac{x+4}{x+4} \cdot \frac{x-3}{x+8} - \frac{2+x}{x+4} \cdot \frac{x+8}{x+8}$

$$\frac{(x+4)(x-3) - (2+x)(x+8)}{(x+4)(x+8)}$$

$$\frac{x^2+x-12 - (x^2+10x+16)}{(x+4)(x+8)}$$

$$\frac{-9x-28}{(x+4)(x+8)}$$

(11-14) Solve for x. Be sure to check for extraneous solutions.

11.  $\frac{x-2}{x-1} = \frac{x+2}{x+4}$

$$(x-2)(x+4) = (x+2)(x-1)$$

$$x^2 + 2x - 8 = x^2 + x - 2$$

$$x = 6$$

12.  $\frac{x+3}{x+3} \cdot \frac{4}{x-2} + \frac{x+8}{x+3} \cdot \frac{x-2}{x-2}$

$$\frac{4(x+3) + (x+8)(x-2)}{(x+3)(x-2)}$$

$$4x + 12 + x^2 + 6x - 16 = x^2 + x - 6$$

$$x^2 + 10x - 4 = x^2 + x - 6$$

$$9x = -2$$

$$x = -\frac{2}{9}$$

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

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

14.  $\frac{x+2}{x+2} \cdot \frac{2x+1}{x-2} - \frac{x-2}{x+2} \cdot \frac{20}{x^2-4}$

$$\frac{(x+2)(2x+1) - x(x-2)}{(x+2)(x-2)} = \frac{20}{x^2-4}$$

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

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

$$2x+1 = x-2$$

$$x = -3$$

$$\frac{(x+2)(x-2)}{x^2-4}$$

$$\frac{2x^2+5x+2-x^2+2x}{x^2-4} = \frac{20}{x^2-4}$$

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

$$x^2+7x-18=0$$

$$(x+9)(x-2) = 0$$

$$x+9=0 \quad x-2=0$$

$$x = -9 \quad x = 2$$