Name: _____ **Date:** _____

Lesson 11 Practice Problems

Section 11.1: Characteristics of Rational Functions

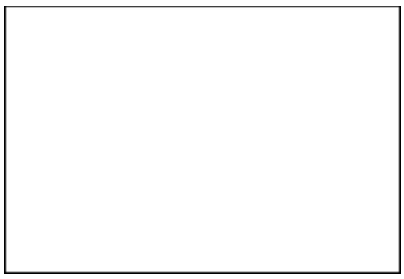
1. Complete the table below.

	Function	Domain	Vertical Asymptote	Horizontal Asymptote
a)	$f(x) = \frac{4x}{6-2x}$			
b)	$f(x) = \frac{8x+2}{3x-9}$			
c)	$s(t) = \frac{6t+4}{t}$			
d)	$p(t) = \frac{t}{12t-6}$			
e)	$f(x) = \frac{2x-1}{4x-2}$			
f)	$g(x) = \frac{3x-4}{2x+3}$			
g)	$f(x) = \frac{8}{3x}$			

Section 11.2: Solving Rational Equations

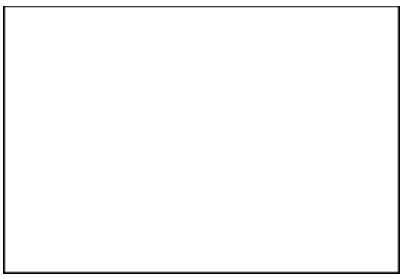
2. Solve each of the following equations by graphing. Round answer(s) to two decimals as needed.

a) $4 = \dfrac{3x}{x-1}$



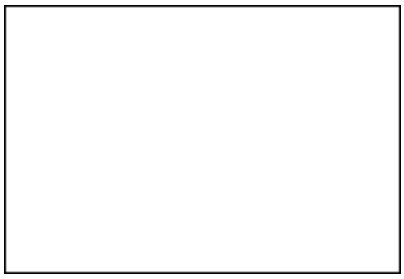
Solution:_____

b) $3 = 2 + \frac{5}{x-2}$



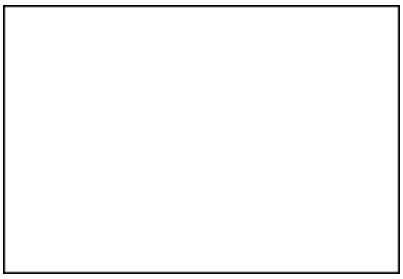
Solution:_____

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



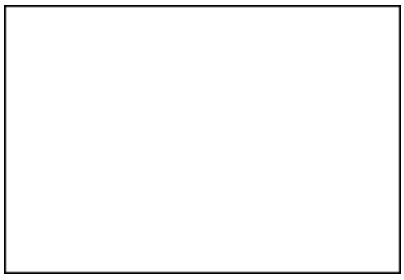
Solution:_____

d) $3 = x + \frac{1}{x}$



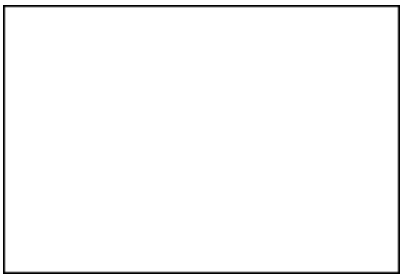
Solution:_____

e) $\frac{5}{x+4} = \frac{12}{13}$



Solution:_____

f) $\frac{2}{x} = 1$



Solution:_____

3. Solve each of the following rational equations algebraically (also called symbolically). Check your work by plugging the value(s) back into the equation or by graphing.

a) $4 = \frac{3}{x-6}$

b) $\frac{4}{x+4} = \frac{6}{x-2}$

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

d) $6 = 2 + \frac{3}{x-5}$

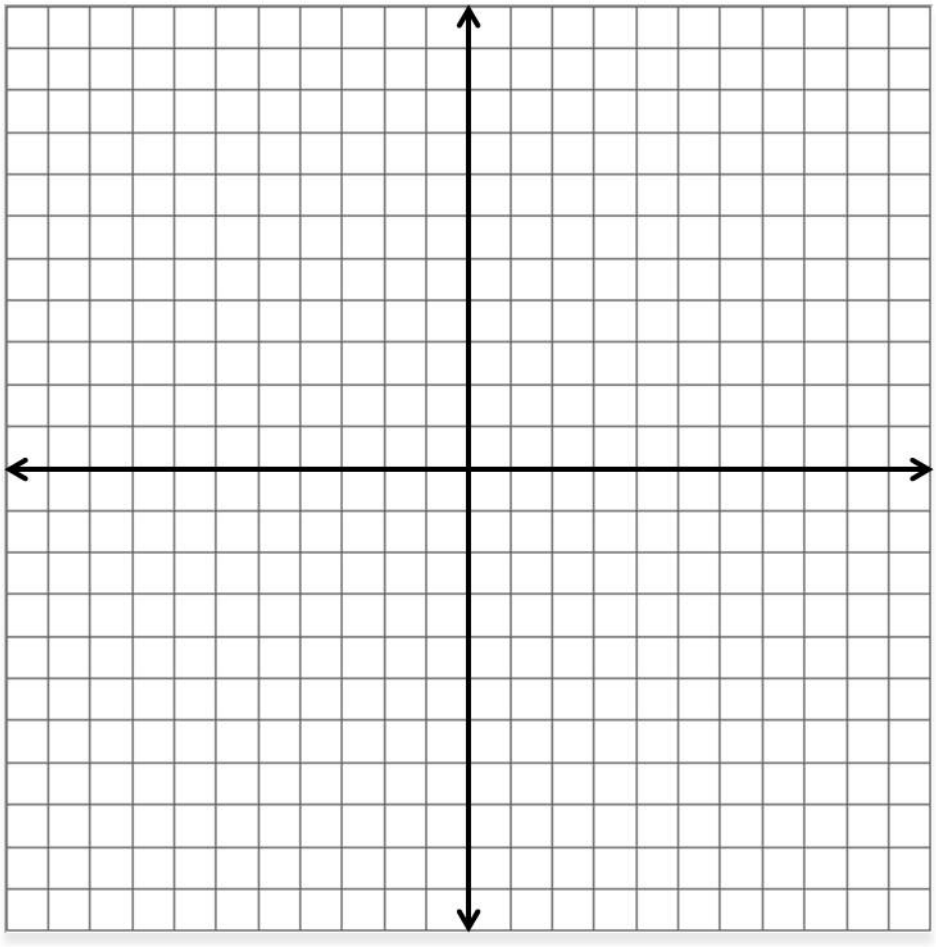
e) $x + 4 = \frac{-4}{x}$

f) $\frac{-1}{x-3} = \frac{x+3}{5}$

4. Graph the rational functions. Make sure to include the domain and any horizontal asymptotes, vertical asymptotes, horizontal intercepts and vertical intercepts (if they exist).

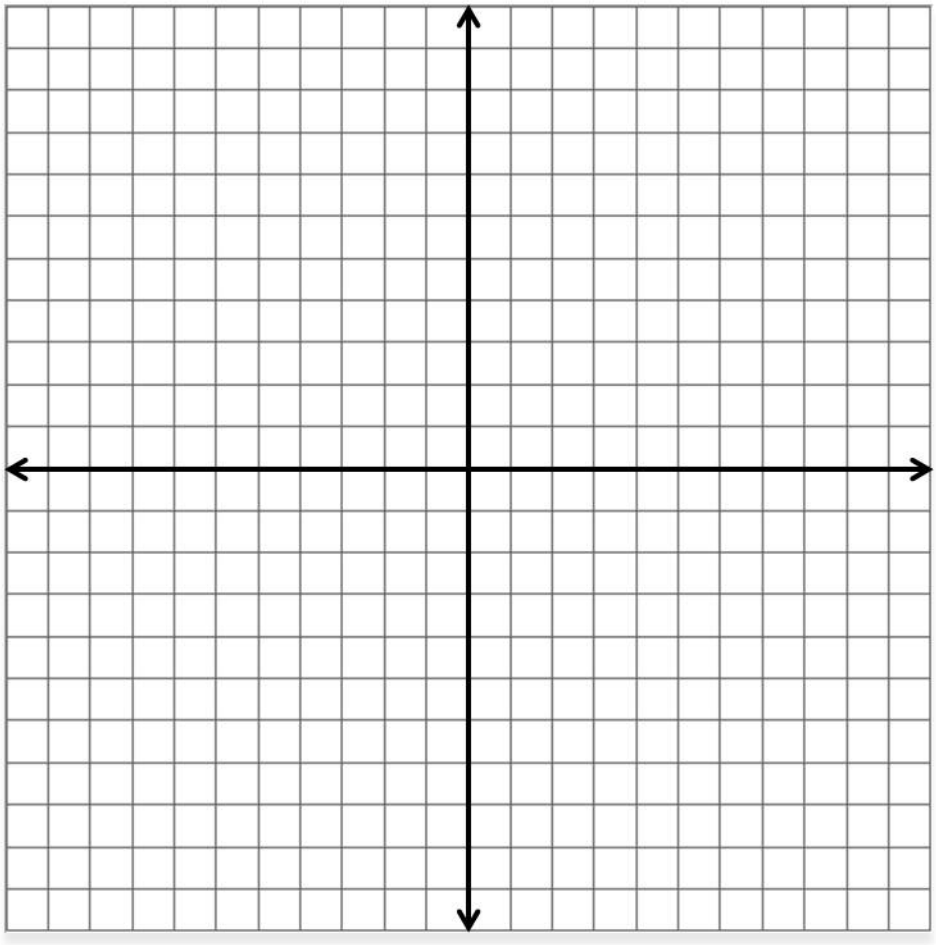
a) $f(x) = \frac{3}{x-2}$

Domain	Horizontal Asymptote	Vertical Asymptote	Horizontal Intercept(s)	Vertical Intercept



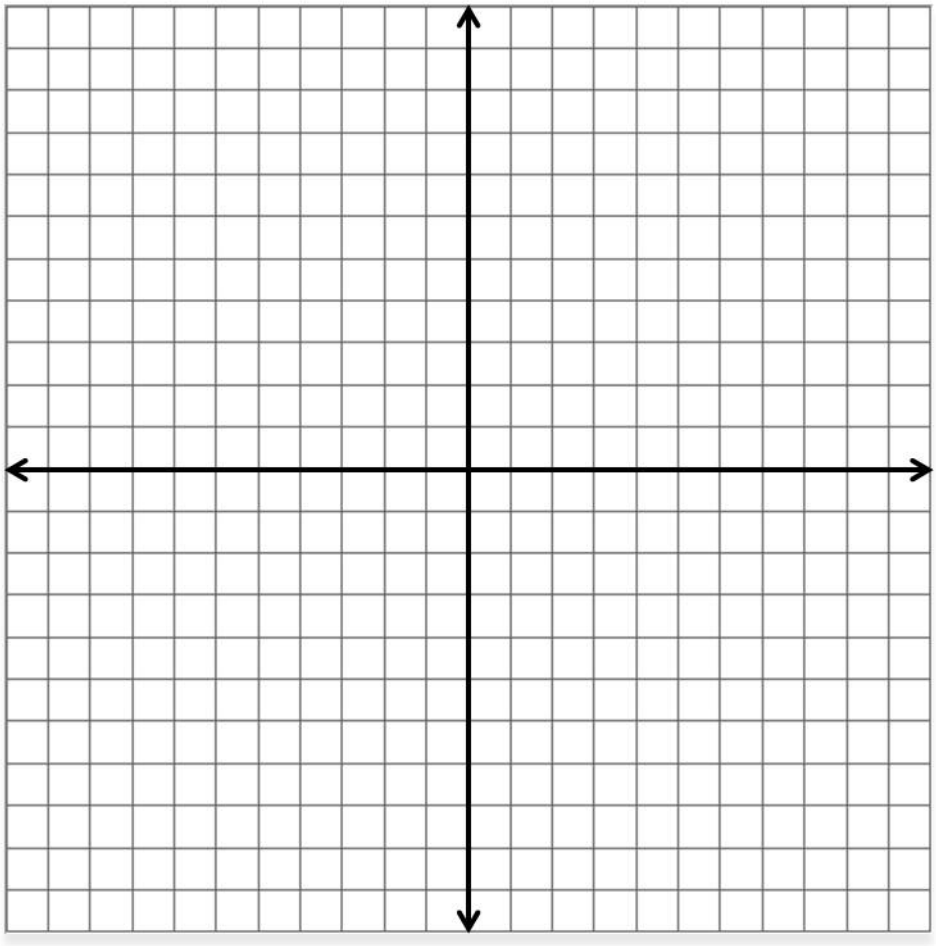
b) $f(x) = \frac{3x+4}{x+3}$

Domain	Horizontal Asymptote	Vertical Asymptote	Horizontal Intercept(s)	Vertical Intercept



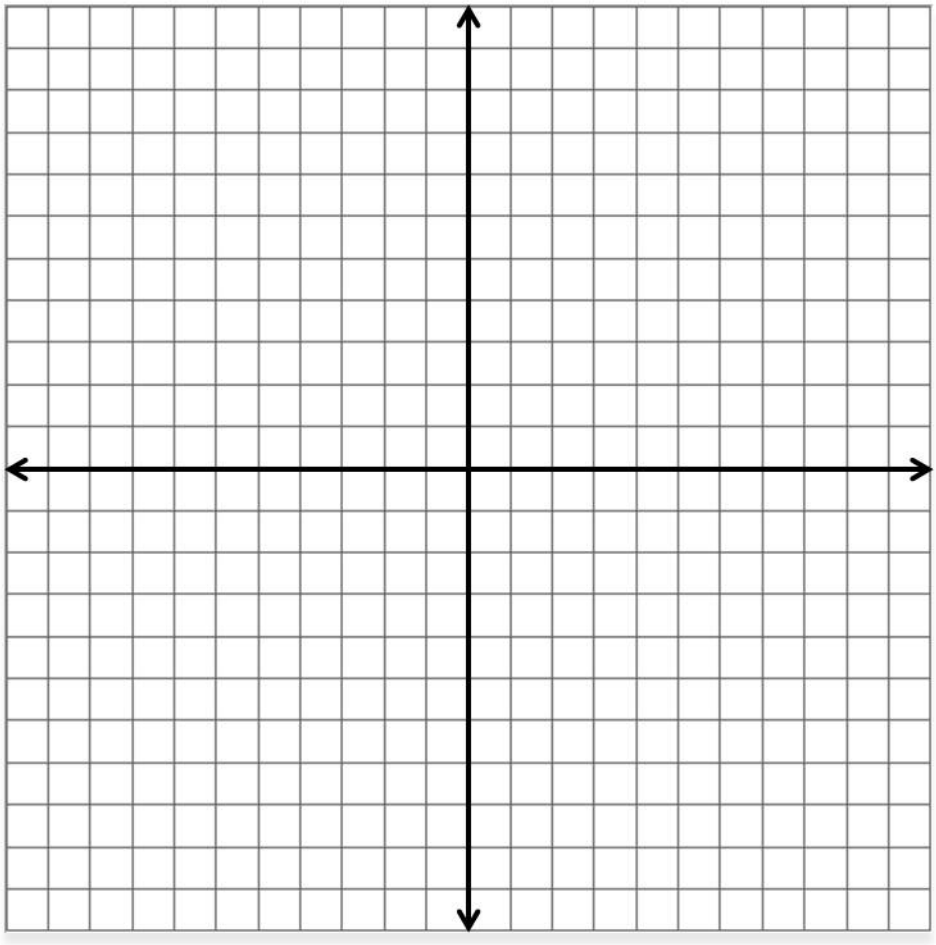
c) $f(x) = \frac{x+7}{4-2x}$

Domain	Horizontal Asymptote	Vertical Asymptote	Horizontal Intercept(s)	Vertical Intercept



d) $f(x) = \frac{2x-1}{x^2-2x}$

Domain	Horizontal Asymptote	Vertical Asymptotes	Horizontal Intercept(s)	Vertical Intercept



5. Determine the following.

a) Let $f(x) = \frac{3}{x-2}$.

Find $f(-1)$ Find x so that $f(x) = 6$

b) Let $h(x) = \frac{3x+4}{x+3}$

Find $h(-2)$ Find x so that $h(x) = \frac{16}{7}$

c) Let $f(x) = \frac{x+7}{4-2x}$.

Find $f(1)$ Find x so that $f(x) = -3$

d) Let $g(x) = \frac{2x-1}{x(x-2)}$

Find $g(3)$ Find x so that $g(x) = \frac{7}{8}$

Section 11.3: Applications of Rational Functions

6. Mr. Sculley decides to make and sell Left Handed Smoke Shifters as a side business. The fixed cost to run his business is $250 per month and the cost to produce each Smoke Shifter averages $8. The Smoke Shifters will sell for $19.95. The function below gives the *average* cost (in dollars) per hat when x hats are produced.

$$A(x) = \frac{8x + 250}{x}$$

a) Determine $A(1)$, and write a sentence explaining the meaning of your answer.

b) Complete the table below.

x	1	2	3	4	5
$A(x)$					

c) Determine $A(10)$, and write a sentence explaining the meaning of your answer.

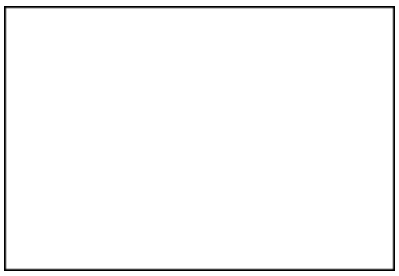
d) How many Smoke Shifters must be produced in order to reduce the average cost to $15 each?

e) Give the *equation* of the horizontal asymptote of $A(x)$, and write a sentence explaining its significance in this situation.

7. You and your friends are heading out to San Deigo on a road trip. From Scottsdale, the trip is 373 miles. Answer the following questions based upon this situation.

   a) Use the relationship, Distance = Rate times Time or $d = rT$, to write a rational function $T(r)$ that has the rate of travel, r (in mph), as its input and the time of travel (in hours) as its output.

   b) Provide a rough but accurate sketch of the graph in the space below. Label your horizontal and vertical axes. You only need to graph the first quadrant information. Indicate the graphing window you chose.



Xmin=_____

Xmax=_____

Ymin=_____

Ymax=_____

   c) According to Google, the trip should take 5 hours and 45 minutes (5.75 hours). Determine your average rate of travel if the trip takes only 5 hours.

   d) Determine the horizontal asymptote for $T(r)$, and write a sentence explaining its significance in this situation.

8. Harkins Theaters offers \$1.50 soft drink refills every time you bring your 2013 Harkins Loyalty Cup to the theater. You can purchase the Loyalty Cup (filled) for \$6.50.
   The function $C(x) = \dfrac{1.5x + 6.5}{x}$ gives the average cost (in dollars) per refill with the Loyalty Cup, where x is the number of soft drink refills purchased.

   a) Determine $C(1)$, and write a sentence explaining the meaning of your answer.

   b) Complete the table below.

x	1	2	3	4	5
$C(x)$					

   c) How many refills must you purchase in order to reduce the average cost to \$2 per refill?

   d) Give the *equation* of the horizontal asymptote of $C(x)$, and write a sentence explaining its significance in this situation.