Honors Algebra II Asymptote Worksheet

Consider the parent graph of the rational function $f(x) = \dfrac{1}{x}$

Complete each of the following tables of values for $f(x)$. Use tables (a), (b), (c), and (d) to answer questions (a), (b), (c), and (d) respectively.

(a)			(b)			(c)			(d)	
x	*f(x)*		*x*	*f(x)*		*x*	*f(x)*		*x*	*f(x)*
-1			1			-1			1	
-0.1			0.1			-10			10	
-0.01			0.01			-100			100	
-0.001			0.001			-1,000			1,000	
-0.0001			0.0001			-10,000			10,000	

(a) What do the values of *f(x)* approach as the value of *x* approaches zero from the negative side?
(As $x \to 0$ and x<0 what does $f(x) \to$?)

(b) What do the values of *f(x)* approach as the value of *x* approaches zero from the positive side?
(As $x \to 0$ and x>0 what does $f(x) \to$?)

(c) What do the values of *f(x)* approach as the value of *x* gets smaller and smaller?
(As $x \to -\infty$ what does $f(x) \to$?)

(d) What do the values of *f(x)* approach as the value of *x* gets bigger and bigger?
(As $x \to \infty$ what does $f(x) \to$?)

(e) What is the value of *f(0)?*

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(f) Think of the graph of this function. The line $x = 0$ is the <u>vertical asymptote</u> of this function. What does this mean in terms of the y-values of the graph?

(g) A <u>horizontal asymptote</u> occurs if a rational function approaches a *y*-value for *x*-values far from the origin (when gets arbitrarily large or small). The line $y = 0$ is the <u>horizontal asymptote</u> of this function. What does this mean in terms of the y-values of the graph of $f(x) = \dfrac{1}{x}$?

Consider the graph of the function $f(x) = \dfrac{2x+3}{x^2 - 5x + 6}$

a. Using your graphing calculator's table, look at very large positive values of x (you can change the x-values in the TableSet window). What number do the y-values seem to be approaching?

b. Now look at very large negative values of x in the same way (like -10,000, -100,000). What number do the y-values seem to be approaching?

c. What x-values are restricted from the domain of this function?(removed from the set of all real numbers)

d. What happens to the y-values of the function as x approaches those restricted values?