Math 115 **Worksheet 20** **November 10, 2014**

Name _____
Group Members:

1. Determine the domains and long run behavior of the following functions.

   (a) $f(x) = \dfrac{x^2 + x - 6}{25 - x^2}$

   (b) $g(x) = \dfrac{x^2 - 2x - 8}{x - 2}$

2. Determine all intercepts and asymptotes of the functions from problem 1.

3. Sketch a graph of the functions from problem 1, clearly labelling intercepts and asymptotes.

4. Find the following limits. (Hint: use your work from the previous problems.)

   (a) $\lim\limits_{x \to 5^+} \dfrac{x^2 + x - 6}{25 - x^2}$

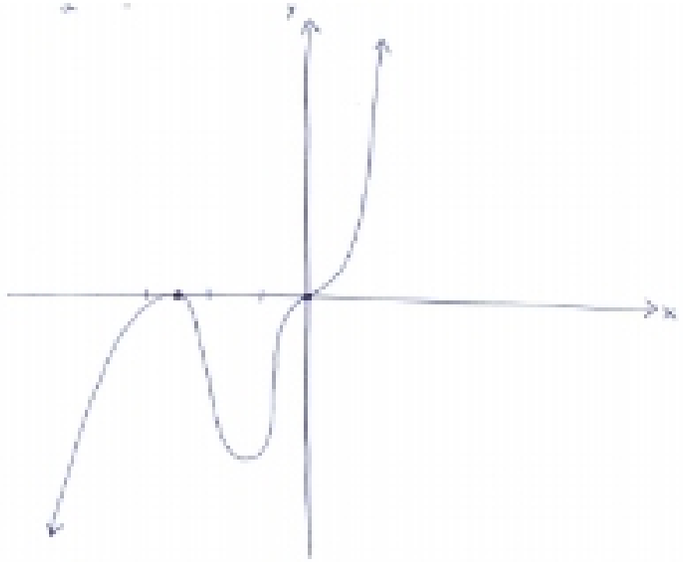
   (b) $\lim\limits_{x \to 5^-} \dfrac{x^2 + x - 6}{25 - x^2}$

   (c) $\lim\limits_{x \to 2^-} \dfrac{x^2 - 2x - 8}{x - 2}$

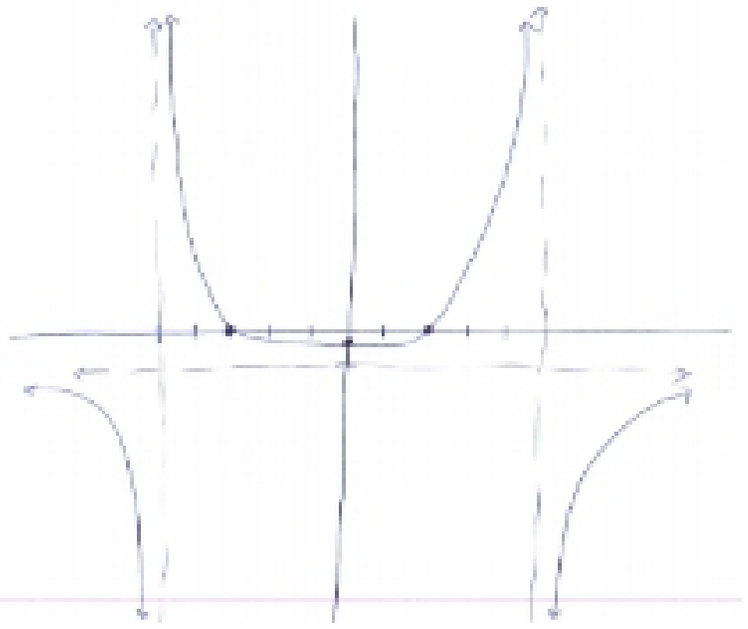
   (d) $\lim\limits_{x \to -2^-} \dfrac{x^2 - 2x - 8}{x - 2}$

5. Identify the graph of the function as polynomial, rational, exponential, or logarithmic. List the domains, asymptotes, and intercepts.

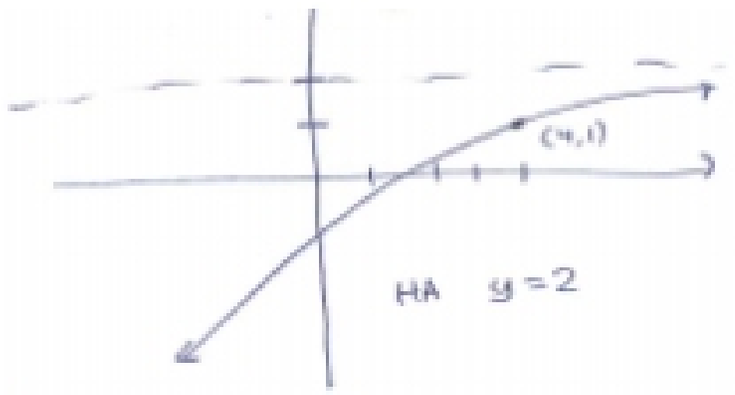
(a)



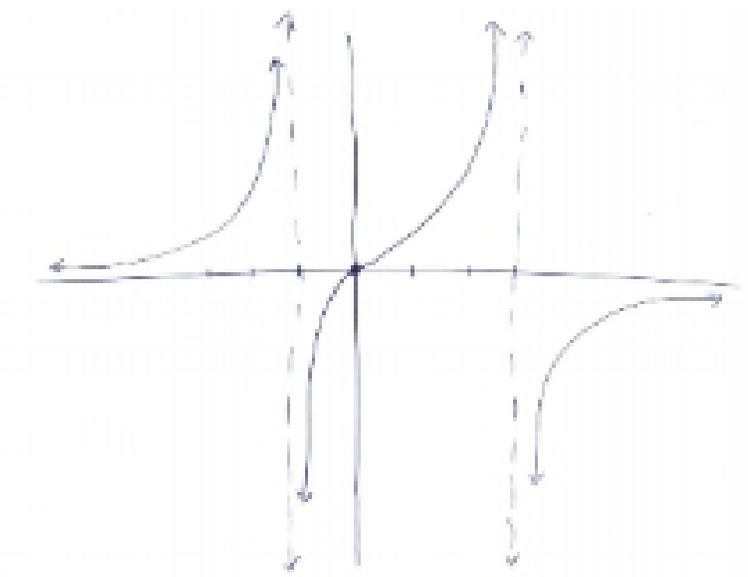
(b)



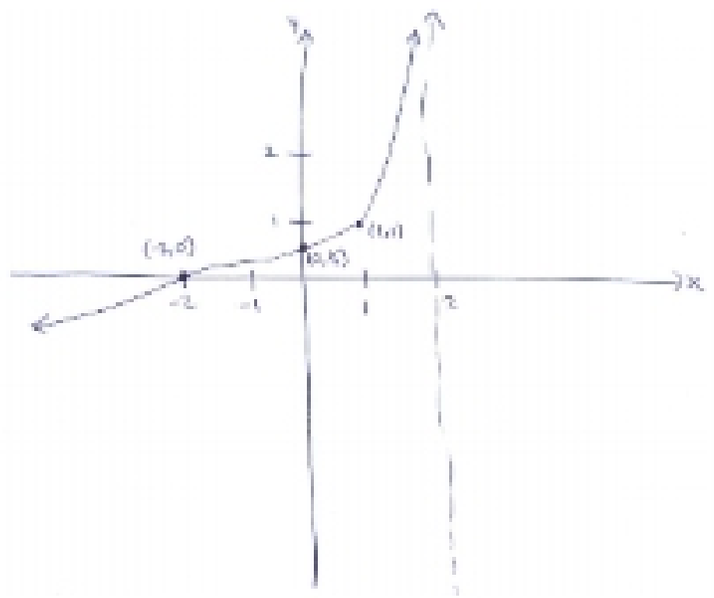
(c)



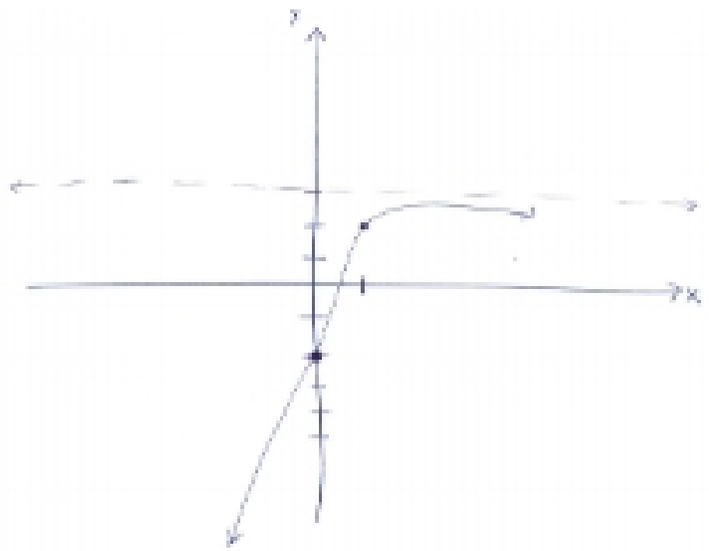
(d)



(e)



(f)



6. Identify each function as polynomial, rational, exponential, or logarithmic. Find the domain, intercepts, asymptotes, and long run behavior.

   (a) $2y - 5x = 1$

   (b) $k(x) = -x^2 - 4x + 5$

   (c) $q(x) = \dfrac{2x - 1}{x - 2}$

   (d) $p(x) = 6(x + 3) - x(x + 1)(x + 3)$

   (e) $w(x) = -\log_4(x - 1)$

   (f) $z(x) = 3 - 5^{1-x}$