Problem Set #3 (5 pts. each) Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Given the function *f* defined by 

A. For what values of x is *f*(x) discontinuous? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

B. At each point of discontinuity found in part A determine whether *f*(x) has a limit, and if so,

give the value of the limit.

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C. Write an equation for each vertical and horizontal asymptote to the graph of *f*.

Justify each answer.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (4 pts)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (4 pts)

D. A rational function is such that *g*(x) = *f*(x) wherever f is defined. Find the

values of a and b.

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2. Given the function *f* where for all real numbers x.

A. Sketch the graph of y = | *f*(x) | (4 pts) B. Sketch the graph of y = (*f*|(x) |) (4 pts)

 

C. Determine whether | *f*(x) | is continuous at x = 0. Justify your answer.

3. Find all the extrema in the interval  for . \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4. Let p and q be real numbers and let f be the function defined by:

, use the definition to show if *f*(x) continuous at x = 1.

1. Find the value of q, in terms of p, for which *f* is continuous at x = 1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Find the values of p and q for which *f* is continuous at x = 1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

5. Given that f is the function defined 

1. Find the  = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Find the zeros of *f*. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Write an equation for each vertical and each horizontal asymptote to the graph of *f*.

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1. Describe the symmetry of the graph of *f*. Show work! (4 pts.)
2. Using the information found in the previous parts, sketch the graph of *f*. (4 pts.)



(4 pts. each)

6. Find the limit:  7. Find the limit: 

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

8. Find the limit:  9. Find the limit: 

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