Math 1351-008 Exam I-A February 7, 2007

Answer the problems (EXCEPT PROBLEM 8) on **separate** paper. You do not need to rewrite the problem statements on your answer sheets. Do your own work. Show **all relevant steps** which lead to your solutions. Attach this question sheet to the front of your answer sheets.

1. (8 pts) Let $P(3,-4)$, $Q(5,1)$ and $R(0,3)$ be three points in the plane.

   A. Plot the points P, Q, R
   B. Is the triangle PQR a right triangle?

2. (10 pts) Solve

   A. the equation $|3+5s|=8$
   B. the inequality $4x-2x^2 \geq 0$

3. (4 pts) Find the center and radius of the circle given by

   $$2x^2+2y^2+4x-6y-12=0$$

4. (4 pts) Find the equation of the line which passes through (2,4) and is parallel to the line given by $4x-3y=8$.

5. (12 pts) Let $f(x)=\dfrac{\sqrt{x-2}}{x+1}$ and $g(x)=\dfrac{x^2-1}{x-1}$

   A. Find the domain of f
   B. Find the domain of g

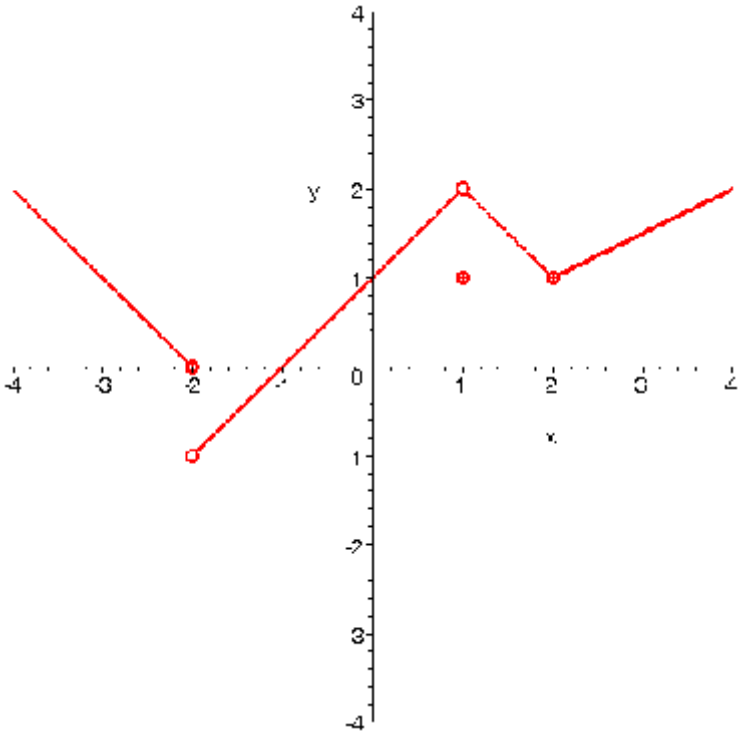
6. (8 pts) Let $f(x)=2x^2-3x$.

   A. Find $f(x+h)$
   B. Find and simplify $\dfrac{f(x+h)-f(x)}{h}$

7. (6 pts) Simplify $\sin(\tan^{-1} x)$

8. (15 pts) Consider the function f defined by the graph to the right. Find each of the following (if they exist). If they do not exist, state so. Also determine if the function is continuous at the given point. If it is not continuous at the given point, state so.

THIS IS A SHORT ANSWER PROBLEM. RECORD YOUR ANSWERS FOR THIS PROBLEM ON THIS PAGE.



A1. $f(-2)$ A2. $f(1)$ A3. $f(2)$

B1. $\lim_{x\to -2^-} f(x)$ B2. $\lim_{x\to 1^-} f(x)$ B3. $\lim_{x\to 2^-} f(x)$

C1. $\lim_{x\to -2^+} f(x)$ C2. $\lim_{x\to 1^+} f(x)$ C3. $\lim_{x\to 2^+} f(x)$

D1. $\lim_{x\to -2} f(x)$ D2. $\lim_{x\to 1} f(x)$ D3. $\lim_{x\to 2} f(x)$

E1. Is f continuous at -2? E2. Is f continuous at 1? E3. Is f continuous at 2?

9. (24 pts) Algebraically evaluate each of the following limits.

A. $\lim_{x\to 2} \dfrac{x^2-2x+4}{x^2-3x+1}$

B. $\lim_{x\to 2} \dfrac{8-2x^2}{x^2-2x}$

C. $\lim_{x\to 0} \dfrac{\sin 3x}{x\cos 2x}$

10. (12 pts) Identify the intervals of continuity of the following functions:

A. $f(x)=\dfrac{x^2}{2-\sin x}$ B. $g(x)=\dfrac{3x+x^2}{x^2-9}$