Bernhart

MATH 171 - First Exam, September 28, 2000

Your Name: _____ Your TA's Name: _____

Show all work! Be sure to cross out anything that you do not want graded. Incorrect work left on your paper will cause you to lose points even if there is also correct work displayed.

Problem	Points
1	
2	
3	
4	
5	
6	
7	
8	
9	
Total	

1. *(10 pts.)* Solve the inequality:

$$| 7 - 5x | \geq 3$$

2.*(12 pts.)* For the two functions below, determine the domain:

(i) $f(x) = \dfrac{1}{x^2 + 8x + 15}$

(ii) $f(x) = \sqrt{\dfrac{1}{x-2} + \dfrac{1}{x+5}}$

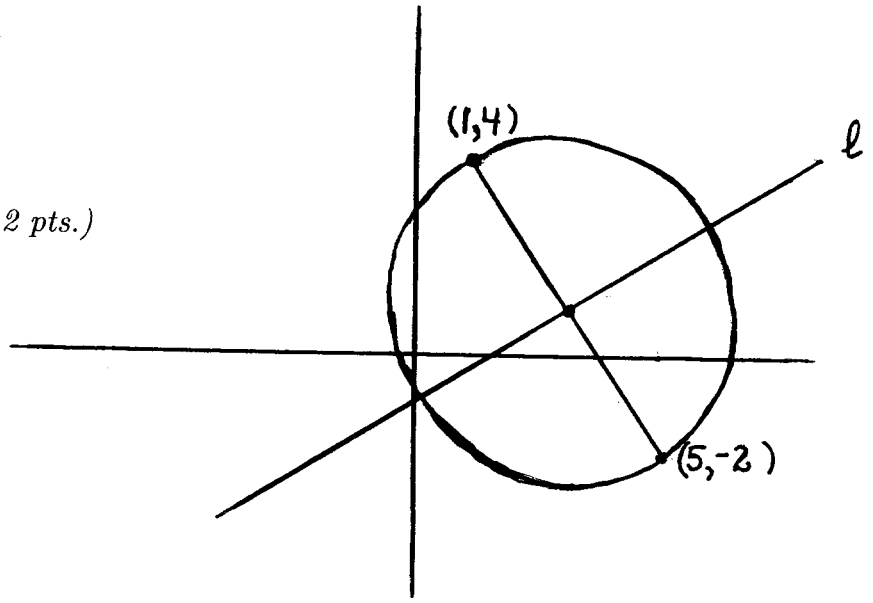
3. *(12 pts.)* Graph the following function.
Be sure to label all endpoints and all intercepts

$$f(x) = \begin{cases} 2x - 1 & -4 \leq x \leq 3 \\ (x-4)^2 + 2 & 3 < x \end{cases}$$

4. *(10 pts.)* Solve the inequality:

$$\frac{2x+6}{x-2} < 0$$

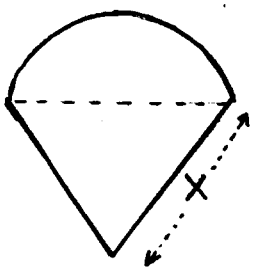
5. *(12 pts.)*



(i) Write the equation of the circle pictured above.

(ii) What is the equation of the perpendicular bisector (line ℓ)?

6. *(12 pts.)*
A playing field consists of an equilateral triangle with a semicircle on top.



(i) Express the perimeter of the field as a function of x.

(ii) Express the area of the field as a function of x.

7. *(8 pts.)* Resistance R in a wire varies directly with the length ℓ of the wire and inversely with the square of its diameter d. If R is 240 ohms, when the length is 2m and the diameter is .1m, find the formula for R.

8. *(12 pts.)* Graph the function $f(x) = x^2 + 3x + 1$.
Be sure to give the **exact values** *of the coordinates of the vertex and intercepts.*

9. *(12 pts.)* In this problem $f(x) = \sqrt{4x-1}$ and $g(x) = 3x^2 + 2$. Compute the following functions **and their domains**:

(a) $(f \circ g)(x) = f(g(x))$

(b) $(g \circ f)(x) = g(f(x))$

(c) $\left(\frac{g}{f}\right)(x) = \frac{g(x)}{f(x)}$