Math 120 C **First Midterm** **Autumn 1999**

Your Name

Your Signature

Student ID #

	Keir		Brett	
Section	1:30	2:30	1:30	2:30
(circle one)	CA	CB	CC	CD

Problem	Total Points	Score
1	12	
2	13	
3	12	
4	13	
Total	50	

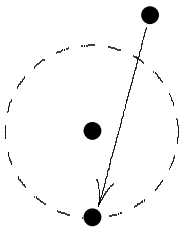
- This exam is closed book. You may use one $8\frac{1}{2} \times 11$ sheet of notes.
- You are not allowed to share notes or calculators.
- In order to receive credit, you must show your work. Be wary of doing computations in your head. Instead, write out your computations on the exam paper.
- **PLACE A BOX AROUND YOUR FINAL ANSWER to each question.**
- If you use a trial and error (or guess and check) method when a more accurate and efficient algebraic method is available, you might not receive full credit.
- If you need more room, use the backs of the pages and indicate to the reader that you have done so.
- Raise your hand if you have a question.

1 (12 points) Solve the following.

(a) (4 points) Find where the line $4y = 12x+23$ intersects the graph of $y = -3x^2+24x-19$.

(b) (4 points) Write $y = 2x^2 + 16x + 27$ in vertex form. Find the vertex and the axis of symmetry.

(c) (4 points) Find the equation for a line through the point $(-117, 6)$ that is perpendicular to $7x - 3y = 41$.



2 (13 points) The lamp on my desk casts a perfect circle of light, with radius 17 inches (see picture). A crumb, left over fom my lunch, is sitting 17 inches South of the lamp. A bug is 10 inches East and 23 inches North of the lamp. The bug crawls straight towards the crumb at a rate of 2 inches per second.

(a) (3 points) Impose a coordinate system and give an equation for the bug's (straight line) path.

(b) (4 points) Where does the bug enter the circle of light?

(c) (6 points) When it the bug closest to the lamp?

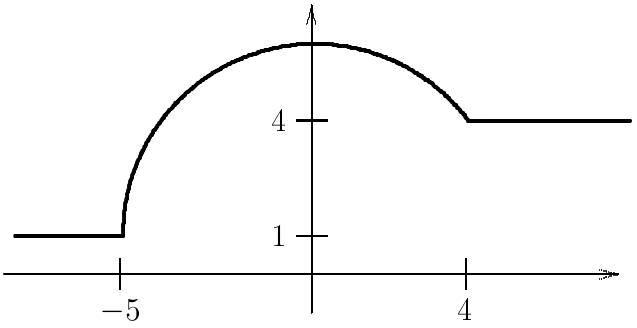
3 (12 points) Clovis is selling tickets to a concert by his rock band "Spent". From past experience he knows he can sell 30 tickets if he charges \$12 a ticket. If he charges \$10 he can sell 40 tickets. Renting the hall and printing the tickets and posters cost him \$150.

(a) (4 points) Give a linear function $n = f(t)$ relating the number of tickets sold n to the price of a ticket t. How much money will he take in if he prices the tickets at \$8?

(b) (4 points) Give a function $p = g(t)$ relating Clovis's profit p to the price of a ticket t. Remember to subtract his costs.

(c) (4 points) What price should he sell the tickets for in order to make as much money as possible?

4 (13 points) To the right is the graph of the function $y = Q(x)$. It is made of straight lines and part of a semicircle.



(a) (6 points) Give a (multipart) formula for $y = Q(x)$.

(b) (7 points) Sketch a careful graph of $y = 3Q[2(x + 1)]$ on the axis below.