Math 120B (Collingwood) Name _____
29 February 2000
Midterm #2 (100 points) TA: _____

Instructions:

- Your exam contains 3 problems. The entire exam is worth 100 points. The point value of each problem is clearly marked.
- Your exam should contain 5 pages; please make sure you have a complete exam.
- Box in your final answer when appropriate. Use the back of your exam pages if you need extra room.
- When appropriate, carry out calculations to at least two decimal places.
- You have 50 minutes for this midterm. You **MUST** show work for credit. No credit for answers only (unless stated otherwise). You may use a graphing calculator to check yourself, but "zooming" is not sufficient justification for any answer on the exam. If in doubt, ask for clarification.
- Make sure to do your own work on the exam.
- Please sign the exam. In doing so, you understand that we may make photocopies of some exams prior to returning.

Signature _____

Problem #1 (38 pts) _____

Problem #2 (26 pts) _____

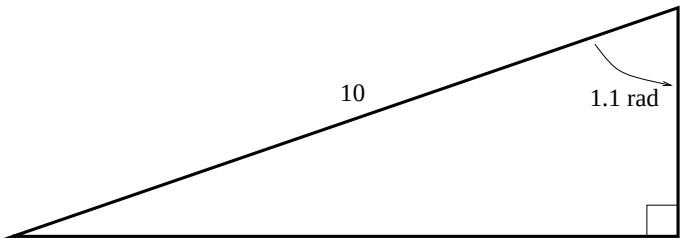
Problem #3 (36 pts) _____

TOTAL (100 pts) _____

1. (38 pts) Short Answer problems:

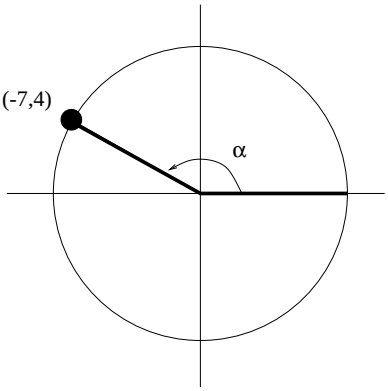
(a) (8pts) Here is a right triangle. Find a.

.

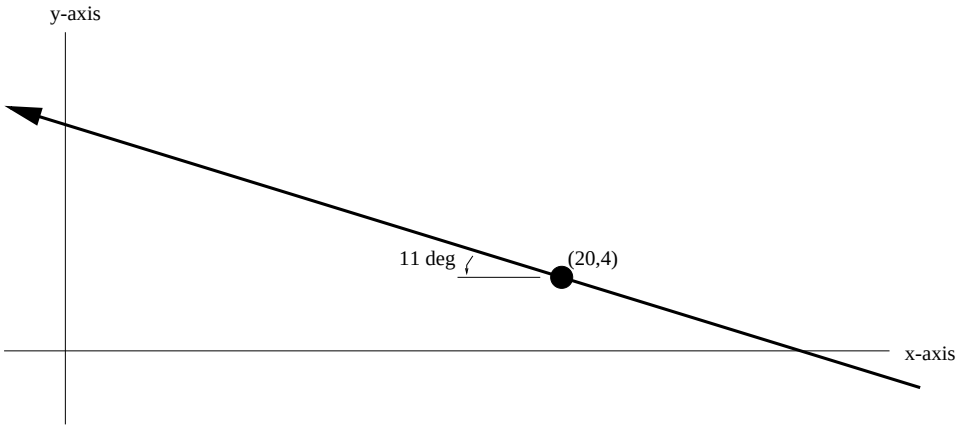


(b) (15pts) Find the angle α in radian units.

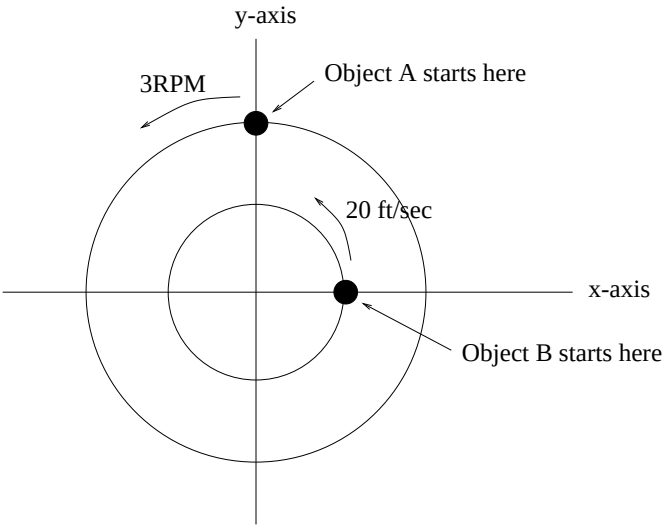
.



(c) (15pts) Find the equation of the pictured line AND the x intercept of the line.



2. (26pts)Objects A and B start moving around the pictured circles. Assume they start moving at the same moment and have the indicated speeds. Impose coordinates as pictured. The small circle has radius 40 ft. and the large circle has radius 80 ft. (RESET YOUR CALCULATOR TO RADIAN MODE!)



(a) (10 pts) Find the angular speed of BOTH objects A and B in units of "rad/sec".

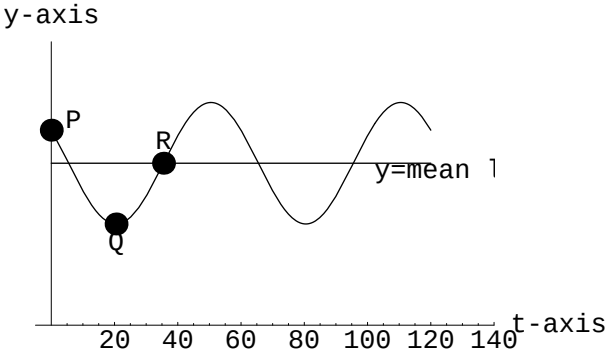
(b) (16 pts) Find the coordinates of the inner object B the instant the outer object A crosses the negative x axis. Also, in the picture, mark the location of the inner object B when the outer object A crosses the negative x axis

3. (36 pts) You have been monitoring the population of squid in an underwater park and have determined that this will be modeled by the sinusoidal function

$$y = s(t) = 15\sin(\frac{\pi}{30}t - 10) + 40,$$

where t is in units of DAYS.

(a) (16 pts) Here is a graph of $y = s(t)$. Find the coordinates of the points P, Q, R in the picture. Show your work; NO CREDIT FOR ANSWERS ONLY.



(b) (20 pts) During the first 60 days, find the total amount of time the squid population is at most 30.