Math 120 (Collingwood)
21 November 2000
Midterm #2 (50 points)

Name _____

TA: _____

. Section: _____

Instructions:

- Your exam contains 4 problems. The entire exam is worth 50 points. The point value of each problem is clearly marked.
- Your exam should contain 4 pages; please make sure you have a complete exam.
- Box in your final answer when appropriate.
- 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). No graphing calculators are allowed. 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 & Student number _____

Problem #1 (5 pts) _____

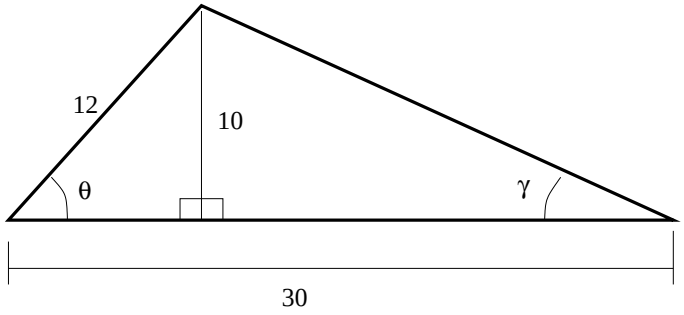
Problem #2 (6 pts) _____

Problem #3 (24 pts) _____

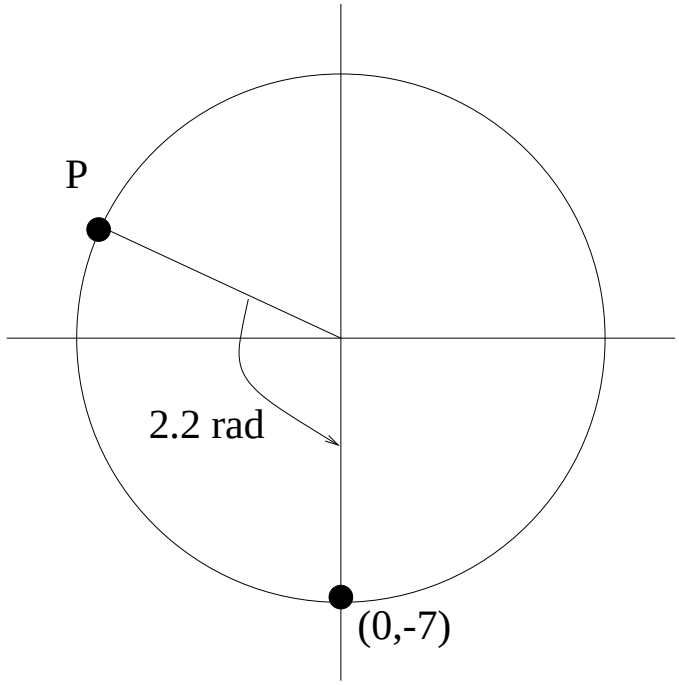
Problem #4 (15 pts) _____

TOTAL (50 pts) _____

1. (5pts) Find the angles θ, γ (use radians). You MUST show your work for credit:



2. (6pts) Find the coordinates of the point P in the picture. You MUST show your work for credit:



3. (24pts) Hugo bakes world famous scones. The key to his success is a special oven whose temperature varies according to a sinusoidal function; assume the temperature of the oven t minutes after inserting the scones is given by

$$y = s(t) = 15\sin(\frac{\pi}{5}t - \frac{3\pi}{2}) + 415 \ \ ^oF$$

You MUST show your work for credit on each part.

(a) (6pts) Find the amplitude, phase shift, period and mean for $s(t)$.

(b) (5pts) What is the maximum temperature of the oven? Give one time when it achieves this maximum temperature during the first 20 minutes of baking?

(c) (13pts) During the first 20 minutes of baking, calculate the total amount of time the oven temperature is at least 410^oF.

4. (15 pts) Here is the graph of the function

$$y = f(x) = \frac{16x}{x^2 + 1}$$

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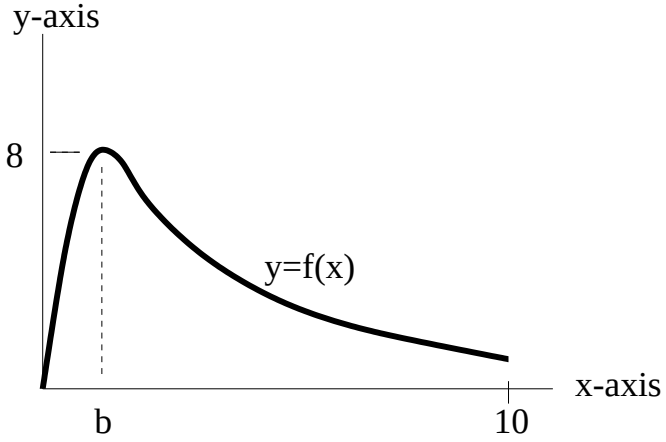

(a) (6pts) Assume the maximum value of the function is 8. Find the value for b in the picture. You MUST show your work for credit.

(b) (4pts) If we restrict the function $y = f(x)$ to the domain $b \leq x \leq 10$, calculate the domain for the inverse function. You MUST show your work for credit:

domain $f^{-1} =$

(c) (5pts) If we restrict the function $y = f(x)$ to the domain $b \leq x \leq 10$, calculate the rule for the inverse function. You MUST show your work for credit: