

Math 120  
26 October 2000  
Quiz #4 (20 points)

Name \_\_\_\_\_  
Section \_\_\_\_\_  
TA: \_\_\_\_\_

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Instructions: You have 25 minutes for this quiz. You **MUST** show work for credit. No credit for answers only. If in doubt, ask for clarification. **NO GRAPHING CALCULATORS ALLOWED.** Use 2 decimal places of accuracy.

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1. (10 pts) Let  $y = f(x) = -\sqrt{4 - (x + 2)^2}$  on the domain  $-4 \leq x \leq 0$ ; the graph of  $f(x)$  is a lower semicircle.

(a) Sketch the graph of  $f(x)$ .

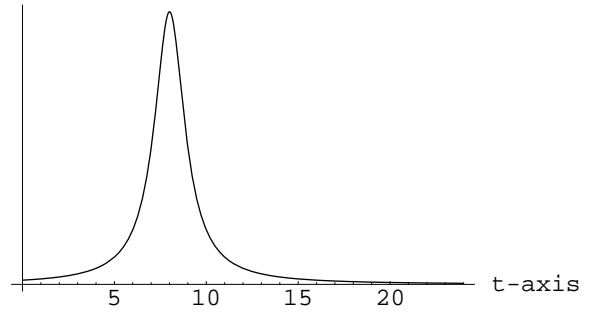
(b) Sketch the graph of  $f(2x)$ .

(c) Find the rule, the largest possible domain and sketch the graph of  $b(x) = 2f(2x) + 4$ .

2. (10pts) The rate of sales in the *Java Cafe* is modeled by the function

$$y = J(t) = \frac{200}{1 + (t - 8)^2} \text{ sales/hour}$$

during a particular 24 hour day; time  $t = 0$ =midnight,  $t = 12$ =noon,  $t = 13$ =1pm, etc. The graph of the function  $J(t)$  is given.



- (a) (1pts) Explain why the function does NOT have an inverse function on the domain  $0 \leq t \leq 24$ .
- (b) (1pts) Assume the maximum rate of sales occurs at 8am. Explain why the function DOES have an inverse function on the domain  $8 \leq t \leq 24$ .
- (c) (6pts) Find a function  $t = J^{-1}(y)$  that inputs a given rate of sales  $y$  and outputs the time  $t$  after 8am when this occurs. You will need to describe the domain, range and rule of  $J^{-1}$ .
- (d) (2pts) At what time after 8am will the rate of sales be half the maximum rate?