

**MATH 111 B**  
Exam I — Version 1  
Hints and Answers

1. (16 points - 4 points each)
  - (a) ANSWER: We accepted answers between 0.80 and 0.87.
  - (b) HINT: Draw a diagonal line with slope 2 and find the time at which it intersects the inflow graph.  
ANSWER: We accepted answers bigger than 2, up to 2.5.
  - (c) i. ANSWER:  $\frac{A(3.5 + h) - A(3.5)}{h} = 1.6$   
ii. ANSWER: During the 4 hours beginning at time  $h$ , 3 thousand gallons flowed into the reservoir.
  
2. (18 points – part (a) was 2 points, 4 points each for the rest)
  - (a) ANSWER: a little bit more than \$500
  - (b) HINT: Draw a tangent line to the  $TC$  graph at  $q = 400$  and find its slope.  
ANSWER: somewhere around \$0.75 (we looked at your work to decide whether or not to accept your answer)
  - (c) ANSWER: somewhere around \$1.25 (again, we looked at your work)
  - (d) HINT: Use the  $TC$  graph to approximate  $TC$  at 300 items. Subtract  $FC$  to get  $VC$  at 300 items. Then  $AVC = \frac{VC}{300}$ .  
ANSWER: somewhere around \$2.08
  - (e) HINT: Draw the  $TR$  graph, a diagonal line with slope 2.5. Find the quantity at which it intersects  $TC$ .  
ANSWER: somewhere around 510
  
3. (16 points – 4 points each)
  - (a) HINT: During the interval from 0 to 4 months, the baby's average rate of growth is 1.7 pounds per month. Multiply by the number of months to get the weight gain.  
ANSWER: 6.8 pounds
  - (b) HINT: During the interval from 16 to 20 months, the baby's average growth rate is 0.825 pounds per month; and during the interval from 20 to 24 months, it is 0.4125 pounds per month. Multiply each growth rate by the number of months and add to get the weight gain. Then, subtract this weight gain from the baby's weight at 24 months.  
ANSWER: 23.65 pounds
  - (c) HINT: Compute the baby's weight gain during the interval from 0 to 4 months and from 4 to 8 months. Divide the total gain by 8 months.  
ANSWER: 1.5375 pounds per month
  - (d) HINT: Compute the baby's weight gain during the intervals from 4 to 8, from 8 to 12, and from 12 to 16. Add them up to get the baby's weight gain from 4 to 16 months and divide the total gain by 12 months.  
ANSWER: 0.78 pounds per month