

MATH 111 C
Exam I — Version 1
Hints and Answers

1. (16 points - 4 points each)
 - (a) ANSWER: 1.53 thousand gallons per hour
 - (b) ANSWER: $t = 4$ or $t = 8$
 - (c) ANSWER: $\frac{A(h+3) - A(h)}{3} = 1.1$
 - (d) ANSWER: During the h hours since 4:00, 3 thousand gallons flows in.

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) ANSWERS: There were two such times. We accepted answers between 2.5 and 3 and between 5.5 and 6.
 - (b) HINT: The height of the graph at $t = 7.5$ gives the overall rate of flow at $t = 7.5$. That is, the height of the graph at $t = 7.5$ gives $\frac{R(7.5)}{7.5}$. Find that height and solve for $R(7.5)$.
ANSWER: We accepted answers between 1.65 and 1.73.
 - (c) HINT: Repeat the process from part (b) twice with $t = 1$ and $t = 4$. Then subtract: $R(4) - R(1)$.
ANSWER: We accepted answers between 1.00 and 1.06.
 - (d) HINT: Repeat the process from part (c) with $t = 2$ and $t = 6$. Then divide by 4, the number of hours.
ANSWER: We accepted answers between 0.25 and 0.27.