MATH 111B – EXAM I Hints and Answers
Autum 2018

Version 1: #1(a) asks for marginal cost at 6 hundred Items.

1. (a) HINT: Compute the slope of the secant line through TC at $q = 6.00$ and $q = 6.01$ hundred Items.
   ANSWER: ~ 1 dollar per Item
   (b) HINT: Compute the slope of the least steep diagonal line that intersects VC.
   ANSWER: ~ 2 dollars per Item
   (c) HINT: Draw a diagonal line with slope 2.5 to see where AVC is equal to 2.50. Note that AVC is *at least* \$2.50 per Item from $q = 1$ to that quantity.
   ANSWER: from $q = 1$ to $q \approx 10$ hundred Items
   (d) i. ANSWER: TR is a diagonal line with slope 4 and Items sell for \$4 each.
   ii. HINT: Use the sliding ruler method to find where $MR = MC$ (and $TR > TC$).
   ANSWER: $q \approx 17.8$ hundred Items

2. (a) i. $\dfrac{P(t+5) - P(t)}{5} = 0.9$
   ii. $G(t) - P(t) = 15$
   (b) HINT: Find the height of the highest point on the ATS graph.
   ANSWER: ~ 1.41 miles per minute
   (c) HINT: Use the fact that $ATS(t) = \frac{P(t)}{t}$ to find $P(60)$.
   ANSWER: 72 miles
   (d) HINT: Again, use the fact that $ATS(t) = \frac{P(t)}{t}$ to find $P(15)$ and $P(40)$. Subtract to get distance traveled. Divide by time elapsed to get average speed.
   ANSWER: 1.46 miles per minute

3. (a) ANSWER: $R(x) = 32x$
   (b) HINT: Profit is the line through the points $(100, 420)$ and $(200, 1120)$.
   ANSWER: $P(x) = 7x - 280$
   (c) HINT: Use (a) and (b) to get $P(150)$ and $R(150)$. Then use the fact that $P(150) = R(150) - C(150)$ to find $C(150)$.
   ANSWER: 4030 dollars
   (d) HINT: Use the fact that $P(x) = R(x) - C(x)$ to get a formula for $C(x)$. Then $FC = C(0)$.
   ANSWER: $FC =$280 dollars
   (e) HINT: Set $P(x) = 0$ and solve for x.
   ANSWER: $x = 40$ Things