MATH 111A – EXAM I Hints and Answers
Autum 2018

**Version 1**: In #1(c), the object's average trip speed changes from 5 to 3 meters per second.

1. (a) HINT: Compute the slope of the secant line through the distance graph at $t = 5$ and $t = 50$.
   ANSWER: $\sim 1.43$ meters per second
   (b) HINT: Compute the slope of the diagonal line through the distance graph at $t = 40$.
   ANSWER: $\sim 2.4$ meters per second
   (c) HINT: Draw diagonal lines with slopes 5 and 3. Look for the where these lines intersect the distance graph.
   ANSWER: from $t \approx 12$ to $t \approx 29$
   (d) i. $\dfrac{D(t+3) - D(t)}{3}$
   ii. The object travels 45 meters from $t = 10$ to $t = 50$ seconds.

2. (a) HINT: Find the height of the $AVC$ graph at $q = 300$ Objects.
   ANSWER: $\sim 3.25$ dollars per Object
   (b) HINT: Find the height of the lowest point on the $AVC$ graph.
   ANSWER: $\sim 2.20$ dollars per Object
   (c) HINT: Use the fact that $AVC(q) = \frac{VC(q)}{q}$ to find $VC(200)$ and $VC(750)$. Subtract to get the change in $VC$.
   ANSWER: 2100 dollars
   (d) HINT: Use the fact that $AVC(q) = \frac{VC(q)}{q}$ to find $VC(600)$ and then use the fact that $TC(q) = VC(q) + FC$.
   ANSWER: 2700 dollars
   (e) HINT: $TR(800) = \$8 \times 600 = \$4800$. You found $TC(600)$ in part (d). Subtract to get profit.
   ANSWER: 2100 dollars

3. (a) HINT: Total revenue is a line through the origin and the point $(20, 640)$.
   ANSWER: $R(x) = 32x$
   (b) HINT: Total cost is a line through the points $(20, 960)$ and $(60, 1440)$.
   ANSWER: $C(x) = 12x + 720$
   (c) HINT: Find $FC$ by computing $C(0)$. Compute $C(50)$ and subtract your fixed costs.
   ANSWER: 600 dollars
   (d) $\overline{MP} = \overline{MR} - \overline{MC} = 20$ dollars
   (e) HINT: Set $R(x) = C(x)$ and solve for $x$.
   ANSWER: 36 Things