MATH 111C – EXAM I Hints and Answers
Version Alpha
Autumn 2011

1. (a) (3 points) HINT: $FC = 15$ hundred dollars. Use the graph to find $TC(16)$ and subtract FC to get $VC(16)$.
   ANSWER: ∼13 hundred dollars

   (b) (4 points) HINT: Compute the slope of the secant line through TC at 36 and 36.01 hundred Blinkos.
   ANSWER: ∼4.29 dollars per Blinko

   (c) (6 points) HINT: The amounts that go in the blanks are the shutdown price and breakeven price.
   ANSWER: ∼\$0.66; ∼\$1.25

   (d) (3 points) HINT: Draw a diagonal line with slope 3.50 and find the quantity at which the line intersects TC.
   ANSWER: $q \approx 7.2$ hundred Blinkos

   (e) (3 points) HINT: Sketch the graph of TR (a diagonal line with slope 2) and find the size of the largest vertical gap between TR and TC.
   ANSWER: ∼21 hundred dollars

2. (a) (3 points) HINT: Compute the slope of the secant line through Car A's distance graph at $t = 40$ and $t = 50$.
   ANSWER: ∼0.32 miles per minute

   (b) (4 points) HINT: Find the slope of the steepest diagonal line that intersects Car A's distance graph.
   ANSWER: ∼0.91 miles per minute

   (c) (4 points) HINT: Sketch the graph of Car B's distance (a diagonal line with slope 0.8) and look for times when Car A's distance graph is above Car B's.
   ANSWER: from $t \approx$15 to $t \approx 36$

   (d) (4 points) HINT: Car B's average speed is always the same: namely, 0.8 mpm. Find a five-minute interval over which the secant line through Car A's distance is parallel to Car B's distance graph.
   ANSWER: from $t \approx 3$ to $t \approx 8$ OR from $t \approx 55$ to $t \approx 60$

3. (a) (3 points) ANSWER: $t \approx 0.5, 4.8, 8.8, 9.8$

   (b) (4 points) HINT: The overall rate of change is 2.5 degrees per hour for the first time at $t = 1.1$. That is, $\dfrac{P(1.1)}{1.1} = 2.5$. Solve for $P(1.1)$ to get the temperature at $t = 1.1$.
   ANSWER: ~ 2.75 degrees

   (c) (5 points) HINT: Use the method from part (b) to find the values of $P(4)$ and $P(9)$.
   ANSWER: The temperature rises.

   (d) (4 points) ANSWER: $\dfrac{P(t+h) - P(t)}{h} = 0.5$