

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

1. (a) (3 points) HINT:  $FC = 20$  hundred dollars. Use the graph to find  $TC(18)$  and subtract  $FC$  to get  $VC(18)$ .  
ANSWER:  $\sim 14$  hundred dollars
- (b) (4 points) HINT: Compute the slope of the secant line through  $TC$  at 36 and 36.01 hundred Blinkos.  
ANSWER:  $\sim 4.375$  dollars per Blinko
- (c) (6 points) HINT: The amounts that go in the blanks are the shutdown price and breakeven price.  
ANSWER:  $\sim \$0.71$ ;  $\sim \$1.53$
- (d) (3 points) HINT: Draw a diagonal line with slope 3.50 and find the quantity at which the line intersects  $TC$ .  
ANSWER:  $q \approx 9.1$  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:  $\sim 13$  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:  $\sim 0.35$  miles per minute
- (b) (4 points) HINT: Find the slope of the steepest diagonal line that intersects Car  $A$ 's distance graph.  
ANSWER:  $\sim 1.37$  miles per minute
- (c) (4 points) HINT: Sketch the graph of Car  $B$ 's distance (a diagonal line with slope 1.0) and look for times when Car  $A$ 's distance graph is above Car  $B$ 's.  
ANSWER: from  $t \approx 9$  to  $t \approx 50$
- (d) (4 points) HINT: Car  $B$ 's average speed is always the same: namely, 1.0 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  $t \approx 2$  to  $t \approx 7$  OR from  $t \approx 53$  to  $t \approx 58$
3. (a) (3 points) ANSWER:  $t \approx 0.6, 7.2, 12.8, 15$
- (b) (4 points) HINT: The overall rate of change is 1.5 degrees per hour for the first time at  $t = 0.9$ . That is,  $\frac{P(0.9)}{0.9} = 1.5$ . Solve for  $P(0.9)$  to get the temperature at  $t = 0.9$ .  
ANSWER:  $\sim 1.35$  degrees
- (c) (5 points) HINT: Use the method from part (b) to find the values of  $P(7)$  and  $P(15)$ .  
ANSWER: The temperature rises.
- (d) (4 points) ANSWER:  $\frac{P(t+h) - P(t)}{h} = 2.4$