MATH 111 A, B
Exam I - Version 1 - Solutions

1. (18 points- 3 each for translation, 2 each for T/F)

English	**Graph**	**Function**	**T/F (circle one)**
The car travels 15 miles in the first 12 minutes.	The height of the graph at $t = 12$ is 15.	$D(12) = 15$	F
The average trip speed at 4 minutes is greater than the average trip speed at 24 minutes.	The diagonal line at $t = 4$ is steeper than the diagonal line at $t = 24$.	$\frac{D(4)}{4} > \frac{D(24)}{24}$	F
The car goes faster, on average, between $t = 12$ and $t = 22$ than it goes between $t = 22$ and $t = 30$.	The secant line between $t = 12$ and $t = 22$ is steeper than the secant line between $t = 22$ and $t = 30$.	$\frac{D(22)-D(12)}{10} > \frac{D(30)-D(22)}{8}$	T

2. (20 points)

   (a) (2 points) Fixed Costs is the value of Total Cost when $q = 0$. We accepted any answer between 160 and 190 (not including 160 and 190).

   (b) (2 points) Find Total Cost at 200 and subtract Fixed Costs. We accepted any answer between 360 and 415 (not including 360 and 415).

   (c) (4 points) Draw the diagonal line to the TC graph that is also a tangent line. The slope of that line is the Breakeven Point. We accepted answers from .71 to .75 (including .71 and .75).

   (d) (3 points) The smallest value of Average Cost is the Breakeven Point. Look at the line you drew in part (c). The quantity at which that line touches the TC graph is the quantity that gives the smallest Average Cost. We accepted anything between 550 and 600 (not including 550 or 600).

   (e) (5 points) Sketch the TR graph: a line with slope 1 (market price = slope of TR). Find the largest vertical distance between TR and TC OR look for the place where the tangent line to TC is parallel to TR (the place where MR=MC). The maximum profit is the distance between TR and TC at that quantity. We accepted answers between 140 and 200 (including 140 and 200).

(f) (4 points) Draw a diagonal line that intersects the TC graph at $q = 4$. This is the TR graph. The slope of TR is the market price. So, find the slope of that line. We accepted answers between .92 and 1.20 (not including .92 and 1.20).

3. (12 points - 3 each)

(a) 1

(b) $AR(2) = TR(2)/2$. Read $AR(2)$ from the graph and multiply by 2. We accepted answers between 9 and 9.5 (not including 9 and 9.5).

(c) You want to compute $TR(4) - TR(3)$. $AR(4) = TR(4)/4$ and $AR(3) = TR(3)/3$. Read $AR(4)$ from the graph and multiply by 4 to get $TR(4)$. Read $AR(3)$ from the graph and multiply by 3 to get $TR(3)$. Then subtract. We accepted answers between 0 and 1.75 (not including 0 and 1.75).

(d) The correct answer is graph (iii). AR is given by the slope of a diagonal line to TR. In graph (i), every diagonal line has the same slope; so, AR would be constant. In graph (ii), the slopes of the diagonals decrease and then increase. In graph (iv), the slopes of the diagonals are always decreasing. The slopes of the diagonals to graph (iii), increase and then start to decrease. That describes the given graph of AR.