An Exercise with Marginal Benefit and Marginal Cost

Name: _____   **Date:** _____

The optimal quantity of some activity is the quantity that will maximize the net total benefit (NTB) from that activity. We find that optimal quantity by comparing the marginal benefit (MB) and marginal cost (MC) of additional units of the activity. The optimal quantity is the one where MB = MC. This exercise provides the opportunity to understand the relationships between marginal and total measures.

Terms:

1. <u>Total benefit</u> is the sum of all benefits from a given quantity of the activity. Total benefit is the sum of the marginal benefit from each additional unit of the activity.
   TB = ∑MBs

2. <u>Total cost</u> is the sum of all costs from a given quantity of the activity. Total cost is the sum of the marginal cost from each additional unit of the activity.
   TC = ∑MCs

3. <u>Net total benefit</u> is the difference between the total benefit and total cost of a given quantity of the activity. Net total benefit is the sum of the net marginal benefit from each additional unit of the activity.
   NTB = TB – TC = ∑NMBs

4. <u>Marginal benefit</u> is the change in total benefit from having one more unit of the activity.
   MB = ∑TB/∑Q

5. <u>Marginal cost</u> is the change in total cost from having one more unit of the activity.
   MC = ∑TC/∑Q

6. <u>Net marginal benefit</u> is the change in net total benefit from one more unit of the activity.
   NMB = ∑NTB/∑Q = MB - MC

7. <u>Deadweight loss</u> is the difference between the net total benefit from the optimal quantity of the activity and the net total benefit from any other quantity. There is a DWL if the market produces any quantity different from the optimal quantity.
   DWL = (NTB at optimal quantity) – (NTB at some other quantity)

Relationships:

1. As long as the MB from an extra unit is positive, TB increases as more units of the activity are provided.

2. MB decreases as more units are provided because each new unit gives less additional benefit than did the previous unit.

3. TB is maximized when the marginal benefit of an extra unit is 0.

4. As long as the MC from an extra unit is positive, TC increases as more units of the activity are provided.

5. MC increases as more units are provided because each new unit costs more to provide than did the previous unit.

6. If MB > MC: NMB > 0 and NTB increases. (This is good.)

7. If MB < MC: NMB < 0 and NTB decreases. (This is not good.)

8. If MB = MC: NMB = 0 and NTB is maximized. (This is what we want.)

Assignment: Answer these questions based on the graph showing the MB and MC of an activity.

1. a) Complete this chart for 60 units of the activity.

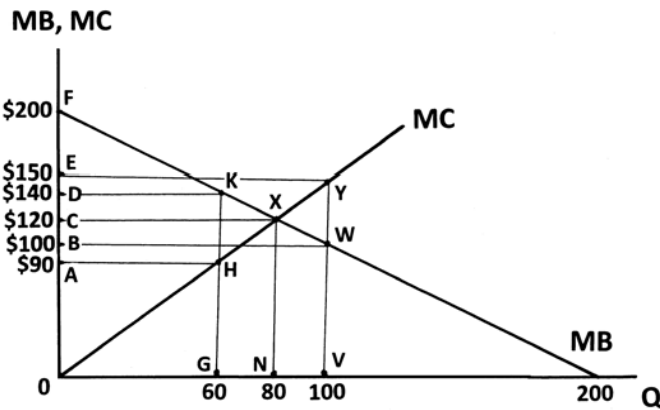|	MB	MC	NMB	TB	TC	NTB
Coordinates						
Dollar Value	$	$	$	$	$	$

b) Indicate on the graph the NTB from 60 units of the activity
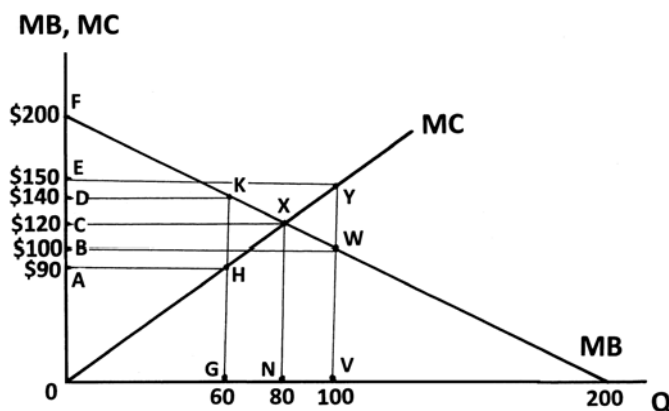
2. a) Complete this chart for 80 units of the activity.

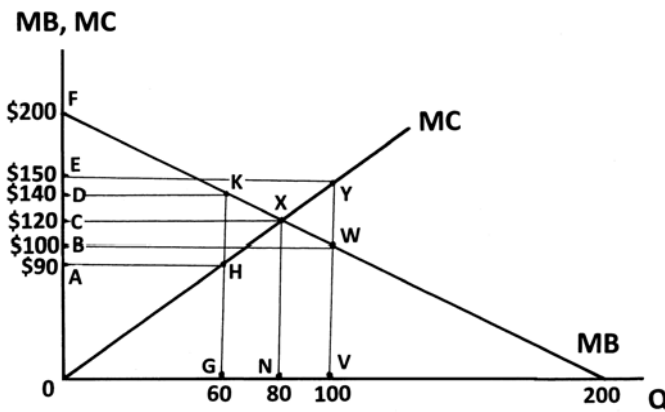|	MB	MC	NMB	TB	TC	NTB
Coordinates						
Dollar Value	$	$	$	$	$	$

b) Indicate on the graph the NTB from 80 units of the activity

3. a) Complete this chart for 100 units of the activity.

	MB	MC	NMB	TB	TC	NTB
Coordinates						
Dollar Value	$	$	$	$	$	$

b) Indicate on the graph the NTB from 100 units of the

4. (a) Complete this chart for the three quantities on the graph.

	Quantity of the Activity		
	60 units	80 units	100 units
Net Total Benefit (NTB)	$	$	$
Deadweight Loss (DWL)	$	$	$

b) Indicate on the graph the areas representing the DWL from 60 units and the DWL from 100 units.