<Undergraduate ECONOMICS Major and Minor>

ASSESSMENT REPORT
ACADEMIC YEAR 2018 – 2019
REPORT DUE DATE: 11/01/2019

Email to submit the report: assessment_cas@usfca.edu

Important: Please write the name of your program or department in the subject line.

For example: FineArts_Major (if you decide to submit a separate report for major and minor); FineArts_Aggregate (when submitting an aggregate report)

I.   LOGISTICS

1. Please indicate the name and email of the program contact person to whom feedback should be sent (usually Chair, Program Director, or Faculty Assessment Coordinator).

Michael Jonas, Ph.D., Assistant Professor, Co-Chair, and Undergraduate Director, Economics Department
mrjonas@usfca.edu
Mario Muzzi, Assistant Professor and Co-Chair, Department of Economics
muzzi@usfca.edu

2. Please indicate if you are submitting report for (a) a Major, (b) a Minor, (c) an aggregate report for a Major & Minor (in which case, each should be explained in a separate paragraph as in this template), (d) a Graduate or (e) a Certificate Program

This is an **aggregate report** for the Undergraduate Economics Major and Minor.

3. Please note that a Curricular Map should accompany every assessment report. Has there been any revisions to the Curricular Map?

No revisions. Curricular Map is submitted as a separate file.

1. Were any changes made to the program mission statement since the last assessment cycle in October 2018? Kindly state "Yes" or "No." Please provide the current mission statement below. If you are submitting <u>an aggregate report, please provide the current mission statements of both the major and the minor program</u>

No Changes to Mission Statement.

Mission Statement (Major/Graduate/Certificate):

With a particular focus on international issues of globalization and poverty, the mission of our department is to equip undergraduate and graduate students with the character and rigorous intellectual foundation in economics to help our students foster a more just and humane world and to carry out a research agenda that contributes at the highest levels to micro and macroeconomic issues related to poverty, economic growth, and globalization.

Mission Statement (Minor):

While it is understood that a minor program provides a subset the curriculum provided by the major program, we are working as a department on writing a separate minor Mission Statement that articulates this distinction. A draft has yet to be accepted by the department as a whole, thus the major Mission Statement above will continue to function as a minor statement, as well.

2. Were any changes made to the program learning outcomes (PLOs) since the last assessment cycle in October 2018? Kindly state "Yes" or "No." Please provide the current PLOs below. If you are submitting <u>an aggregate report, please provide the current PLOs for both the major and the minor programs.</u>

PLOs (Major/Graduate/Certificate):

No changes to PLO's (other than adding a hyphen to "real-world")

1. Economic literacy
   Students will engage in the systematic study of foundational economic concepts and relate them to economic problems and phenomena faced by people and firms.

2. Economic theory

   Students will use mathematical models, relational diagrams, and optimization techniques from microeconomic and macroeconomic theory to analyze real-world economic problems and generate testable predictions about economic phenomena.

3. Empirical economics

   Students will apply quantitative statistical analysis and experimental methods to conduct data-driven inference, interpret figures and statistical tables, test theories, and identify causal relationships.

4. Economic citizenship

   Students will employ economic reasoning and quantitative techniques to evaluate and critique economic policies, arguments, and social problems, with a particular emphasis on the role economics plays in advancing human well-being for the poor and disadvantaged.

PLOs (Minor):

As in the case of the Mission Statement, we currently do not have separate PLO's for our Major and Minor. It is understood that minors are not expected to master any of the PLO's, rather achieve "Introduction" and "Developing" status, but not "Mastery".

3. State the particular Program Learning Outcome(s) you assessed for the academic year 2018-2019.

PLO(s) being assessed (Major/Graduate/Certificate):

Direct Methods:
Program Learning Outcome 2 is being assessed for both the Major and Minor

   Students will use mathematical models, relational diagrams, and optimization techniques from microeconomic and macroeconomic theory to analyze real-world economic problems and generate testable predictions about economic phenomena.

Indirect Methods:

   PLO #3 Empirical economics

   Students will apply quantitative statistical analysis and experimental methods to conduct data-driven inference, interpret figures and statistical tables, test theories, and identify causal relationships.

III. METHODOLOGY

Describe the methodology that you used to assess the PLO(s).

Important: *Please attach, at the end of this report, a copy of the rubric used for assessment.*

Methodology used (Major/Graduate/Certificate):

Direct Methods were used to evaluate student achievement of our **PLO #2 Economic Theory**.

The student work product chosen for this assessment is the Final Exam for ECON 311 Intermediate Microeconomics. This course is required for all majors, and is optional for minors. One section was chosen for each of Fall 2018 and Spring 2019, both of which were taught by Professor Mario Muzzi.

Assessment was based on original exam grading of relevant questions by Professor Muzzi, as well as a second round of evaluation performed by Professor Jonas.

Please see appendix for text of exam questions.

In addition, indirect methods in the form of a voluntary student survey was used to evaluate PLO #3. The survey was given to all students in two sections of ECON 320 Econometrics at the end of the Spring 2019 semester.

To evaluate this program learning outcome, we focus on the final exam for the Intermediate Microeconomics. Each student to graduate from the undergraduate program in Economics is required to take the ECON 311 course, and they are advised to take this course in the second year of their studies. Minors in the program must take either ECON 312 Intermediate Macroeconomics or ECON 311 Intermediate Microeconomics. Professors teaching this class in the past had worked together to ensure a similar final exam for students in all sections, and these require students to "use mathematical models, relational diagrams, and optimization techniques from microeconomic theory to analyze real world economic problems and generate testable predictions about economic phenomena"

The components of the PLO that were examined separately were tied to the following specific exam questions:

Theoretical Understanding: Questions 4,8,9,11,12 from part 1

Use of Diagrams: Questions 7, 13 from part 1; Questions 1,2,6 from part 2

Mathematical Models: 1,2,5,10

The rubric for evaluating the essays was as follows:

1: Exceeds Expectations: Students were able to demonstrate mastery of multiple models of microeconomic theory, utilizing diagrams, mathematical models, and narrative techniques.

2: Meets Expectations: Students were able to demonstrate mastery of one model of microeconomic theory, and familiarity of multiple models.

3: Needs Improvement: Students demonstrated useful familiarity with at least one model of microeconomic theory

4: Below Expectations: Students did not display mastery or useful familiarity of models of microeconomic theory.

IV. RESULTS & MAJOR FINDINGS

What are the major takeaways from your assessment exercise?

This section is for you to highlight the results of the exercise. Pertinent information here would include:

a. how well students mastered the outcome at the level they were intended to,

b. any trends noticed over the past few assessment cycles, and

c. the levels at which students mastered the outcome based on the rubric used.

Results (Major/Graduate/Certificate):

Fall 2018: BA ECON Majors (Total of 24 Exams)

	1.Exceeds expectations	2.Meets expectations	3.Needs improvement	4.Below expectations
Theoretical understanding (articulating key concepts with effective argumentation)	6 (25%)	6 (25%)	6 (25%)	6 (25%)
Use of Diagrams	3 (12.5%)	8 (33%)	7 (29%)	6 (25%)
Use of **mathematical optimization models**	5 (21%)	7 (29%)	6 (25%)	6 (25%)

Spring 2019: BA ECON Majors (Total of 21 Exams)

	1.Exceeds expectations	2.Meets expectations	3.Needs improvement	4.Below expectations
Theoretical understanding (articulating key concepts with effective argumentation)	7 (33%)	7 (33%)	2 (9.5%)	5 (24%)
Use of Diagrams	8 (38%)	7 (33%)	3 (14%)	3 (14%)
Use of **mathematical optimization models**	8 (38%)	5 (24%)	5 (24%)	3 (14%)

Discussion:

These direct results suggest the course delivered challenging material covering key aspects of microeconomic theory and analysis. While the majority of students met or exceeded expectations in each category, the percentage falling into the lowest category is somewhat worrying and has spurred further discussion and analysis. Based on these results, we plan to revisit this PLO across all sections and instructors each semester this coming assessment round (typically 3 sections per year). This will allow us to establish how consistent these findings are across settings.

This course is known for its challenging material, and acts as a "gatekeeper" course for the major, so the fact that many students find it difficult to achieve competency of the topics at this level is not a surprise. While these topics are introduced in the pre-requisite course ECON 111 Principles of Microeconomics, students at the 300 level are expected to apply more sophisticated mathematical models and make connections across topics at a higher level.

400 level electives, at least one of which is required for all majors, as well as the required 400 level capstone course, will refine these skills and give students another chance at mastery. We will be assessing this PLO #2 at the 400 level next round.

Indirect Methods: End-of-semester survey

Students all students in ECON 320 Econometrics were given an anonymous "exit survey" in which they were asked to evaluate how well they were able to master our PLO#3

(10)   On a scale of 1-5 (circle one), how well do you feel that you have mastered the Program Learning Outcome below?

1   2   3   4   5

Empirical economics

Students will apply quantitative statistical analysis and experimental methods to conduct data-driven inference, interpret figures and statistical tables, test theories, and identify causal relationships.

The mean response was 3.96 out of 5, across a sample of 42 surveys. We are satisfied that this indicates adequate student understanding of the PLO, but we will continue to execute this survey and gather responses each semester, giving us the ability to gauge any changes over time.

Results (Minor):

Fall 2018: BA ECON Minors (Total of 5 Exams)

	1.Exceeds expectations	2.Meets expectations	3.Needs improvement	4.Below expectations
Theoretical understanding (articulating key concepts with effective argumentation)	2 (40%)	1 (20%)	2 (40%)	0 (0%)
Use of Diagrams	2 (40%)	1 (20%)	1 (20%)	1 (20%)
Use of **mathematical optimization models**	2 (40%)	0 (0%)	2 (40%)	1 (20%)

Spring 2019: BA ECON Minors (Total of 4 Exams)

	1.Exceeds expectations	2.Meets expectations	3.Needs improvement	4.Below expectations
Theoretical understanding (articulating key concepts with effective argumentation)	2(50%)	1 (25%)	1 (25%)	0 (0%)
Use of Diagrams	1 (25%)	1 (25%)	1 (25%)	1 (25%)
Use of **mathematical optimization models**	2 (50%)	0 (0%)	1 (25%)	1 (25%)

Discussion: While difficult, and potentially misleading, to draw a conclusion based on such a small sample, we are happy to see that there is no apparent distinction between the

performance of major and minor students at this level. The prerequisite courses and training up to this point in the curriculum are identical, thus no differences would be expected.

We will continue to gather data on minor student performance for this PLO using the same method over the following 4 semesters, giving us the ability form a larger sample, longitudinal study of minor vs. major performance.

V. CLOSING THE LOOP

1. Based on your results, what changes/modifications are you planning in order to achieve the desired level of mastery in the assessed learning outcome? This section could also address more long-term planning that your department/program is considering and does not require that any changes need to be implemented in the next academic year itself.

Closing the Loop (Major/Graduate/Certificate):

This round of assessment analysis and reflection on results has given us a lot to think about moving forward. Specifically, there are three areas where we see room for improvement:

First, following FDCD feedback last round, we would like to work on creating a more nuanced rubric for this and all PLO's. While we are happy with how our rubric, exam questions and PLO relate to one another, we would like to be able to extract information on student achievement of more specific skills.

Second, we would like to initiate a methodology by which we can input student scores on work products tied to specific PLOs each semester, and track progress anonymously. This would allow us to create a longitudinal study tracking the rate at which students achieve mastery of each PLO, and which characteristics correlate with delayed or accelerated achievement. Characteristics of interest would be major/minor status, number of units attempted in the given semester, past grades, among others. There are many issues with such a scheme, but I think it has great potential both in assessing the department's success at achieving our learning outcomes, and identifying risk factors for students.

Lastly, we will make an amendment to the department bylaws establishing a 5 member assessment committee with 2 year rotating membership among all full-time faculty.

2. What were the most important suggestions/feedback from the FDCD on your last assessment report (for academic year 2016-2017, submitted in October 2017)? How did you incorporate or address the suggestion(s) in this report?

Suggestions (Major/Graduate/Certificate):

As mentioned, creating a more detailed rubric, both in number of evaluated skills and categories of achievement, was a valuable suggestion. We took a minor stride in that direction this round, and are already drafting an expanded rubric for the past two PLO's assessed, to be revisited next year. Thank you!

ADDITIONAL MATERIALS

(Any rubrics used for assessment, relevant tables, charts and figures should be included here)

Name_____   Economics 311- Fall 2018
                                                        Intermediate Microeconomics
                                                        Instr. Mario Muzzi

FINAL EXAMINATION

There are two sections to this exam, one short answer section consisting of 19 questions (76 points total), and the second section consisting of six longer problems (84 points total). Point values are assigned next to each question. This exam is out of 150 points

(10pts extra credit). This exam is to be taken with a scientific calculator, but with closed book and closed notes. Write all your answers on this exam sheet in the space provided for each question.

Section I—19 Short-Answer Questions (76 points; 4 points each unless otherwise stated):

1. Supply & Demand: The demand for Goobers is $Q_D = 42 + 2A - 3P_G$, and the supply of Goobers is $Q_S = -10 + P_G$, where A is advertising, which is equal to 10. What is the equilibrium quantity, Q^*, of Goobers transacted on the market? (Show work below.)

2. Elasticity: What is the elasticity of advertising, ε_A in #1? i.e. for a 1% change in advertising, how much will the quantity demanded, Q_D, increase?

3. Taxes: If the government imposes a $1 sales tax on Goobers, how much of the tax will be absorbed by the producer of Goobers?

4. Government Intervention: Which of the following **TWO** statements are **true** about price floors?
a) They create surpluses.
b) They create shortages.
c) The minimum wage is a good example of a price floor.
d) Rent control is a good example of a price ceiling.
e) Milk price supports are good examples of a price ceiling.

5. Consumer Choice: If Gandalf's utility function for Dum-dums and Tootsie pops is $U_G = 2D - \frac{1}{2}D^2 + 2T - \frac{1}{2}T^2$, and P_D is twice as much as P_T, which **one** of the following must be **true** according to the Utility Maximizing Rule?
a) Gandalf consumes equal amounts of Dum-dums and Tootsie pops.
b) Gandalf consumes more Dum-dums than Tootsie pops.
c) Gandalf consumes fewer Dum-dums than Tootsie pops.
d) We have no way of knowing what Gandalf does with respect to Dum-dums and Tootsie pops.

6. Uncertainty: If Boramir is risk-averse, which **TWO** of the following *definitely* will be **true**?
a) He would prefer getting $3000 for sure to a 50-50% gamble between getting $0 and $10,000.
b) He would prefer getting $5000 for sure to a 50-50% gamble between getting $0 and $10,000.
c) He would prefer getting $7000 for sure to a 30% chance of getting $0 and a 70% chance of getting 10,000.
d) He would prefer getting $5000 for sure to a 30% chance of getting $0 and a 70% chance of getting 10,000.

7. <u>Optimization</u>: Leonardo consumes only cookies and books. At his current consumption bundle, he is spending all his income and his marginal utility from his last book is 10 utils and from his last cookie is 5 utils. Each book costs him $10 and each cookie costs $2. Is he maximizing his utility? Explain. Draw a graph of the consumer choice model for Leonardo showing his current utility level and whether he can improve his situation.

<u>Explain here:</u>

8. <u>Natural Monopoly</u>: Which are <u>**two**</u> statements are <u>**not**</u> true of a natural monopoly?
a) The regulated price is typically set equal to marginal cost.
b) At the profit maximizing quantity of output, average total cost is falling.
c) Marginal cost is upward sloping at low amounts of production.
d) The regulated price is typically set equal to the average total cost.

9. <u>Market Structures</u>: In which <u>**two**</u> of the following types of market structures will profits tend to go to zero in the long-run?
a) Perfect competition
b) Monopoly
c) Cournot competition
d) Bertrand competition with homogeneous products.
e) Bertrand competition with heterogeneous products

10. <u>Game Theory</u>: Suppose Burger King and McDonalds are considering how much money they should spend on advertising in the year 2018. They have two options, a large budget or a small one. Assume that advertising increases each restaurant's total revenues and total costs and, therefore, affects their profits. The restaurants face the following profits. Remember the upper right-hand numbers of each box are McDonald's <u>**profits**</u> and the lower right are Burger King's profits.

McDonalds

	Small Budget	Large Budget
Small Budget	$10,000 $10,000	$18,000 $5,000
Large	$5,000 $18,000	$8,000 $8,000

Burger King

Budget

    a) (2pts) Find the Nash Equilibrium.

    b) (2pt) Briefly explain why this outcome is an example of the prisoner's dilemma?

11. <u>Public Good</u>: Mayor Bruno faces the following problem: The citizens of San Bruno want to build a public park. The park will be built by buying up land and converting it to open space. The market price of an acre is $100. There are 1000 citizens, each of whom has a demand curve equal to $P = 1.1 – 0.001A$, where A is the number of acres purchased to make room for the park, and P is the price each citizen is willing to pay per acre. How many acres should Bruno purchase to make room for the park?

12. <u>Type of Good</u>: For each of the following goods, tell whether consumption is i) rival or non-rival, ii) exclusive or non-exclusive, and iii) whether it is a private good, common resource, public good, or natural monopoly:

a) Cod Fishing in the Atlantic Ocean _____ _____ _____

b) U.S. Navy Aircraft Carrier _____ _____ _____

c) SiriusXM Satellite Radio _____ _____ _____

d) Snickers Candy Bar _____ _____ _____

13. <u>Edgeworth Box</u>: In the figure below, there are 200 chocolates, and 100 lollies. Legolas currently has 120 of the chocolates, and 30 of the lollies at point A, while Gimli has the remainder of both. Legolas's utility is increasing to the northeast, while Gimli's is increasing to the southwest.
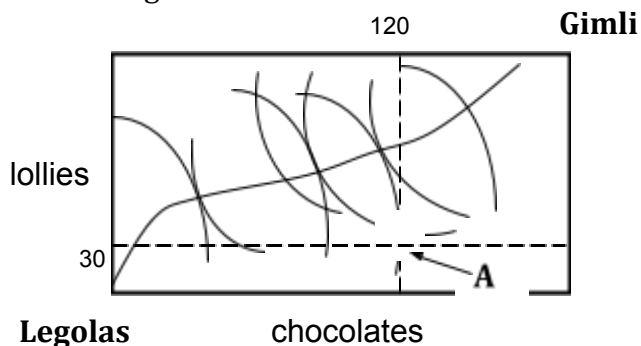
Which **TWO** of the following are **TRUE?**
a) To reach a Pareto-superior allocation to A, Gimli must trade away chocolates for lollies.
b) To reach a Pareto-superior allocation to A, Legolas must trade away lollies for chocolates.
c) A new allocation that is Pareto superior to A must involve Legolas trading away chocolates to Gimli to get lollies.

d) Any new allocation involving Legolas trading away lollies to Gimli to get chocolates is Pareto *inferior* to A.

14. Assuming the initial allocation is A, using the diagram above, with your pencil
a) Identify the Pareto Efficient points in the diagram. (Label each "PE" above)
b) Shade in the entire area that represents the set of allocations that is Pareto <u>superior</u> to A

15. <u>Signaling</u>: Suppose 60% of all workers are of high ability. If a firm knows a worker's ability, workers of low ability are paid $2,000,000 over their lifetime and workers of high ability are paid $3,000,000 over their lifetime. Currently, firms are unable to distinguish high ability from low ability workers. Assuming a college degree can signal ability, and the cost of the degree is $500,000 for high ability workers and $650,000 for low ability workers, will there be a pooling equilibrium or a separating equilibrium? (Show calculations)

16. <u>The Coase Theorem</u>: Fred has opened a cattle ranch one mile from Donna's Restaurant. In the evening the odor from the cattle ranch gently wafts over to the restaurant. The more cattle on the ranch the greater the unpleasant odor and the more Donna's business is harmed. Because of this nuisance (or production externality), Donna files a lawsuit against Fred seeking an injunction that would shut-down the ranch. The economics of the conflict are summarized as follows:

# of cattle on ranch	Value of Fred's Ranch	Value of Donna's Restaurant
500	$250,000	$100,000
400	$225,000	$160,000
300	$190,000	$210,000
200	$145,000	$250,000
100	$90,000	$280,000
0	$25,000	$300,000

According to the Coase Theorem, what will happen if there are no transaction costs a.k.a. no barriers to negotiations? (explain your answer)

    i)   The court grants Donna an injunction against Fred?

    ii)   The court denies the injunction against Fred?

17. <u>Externalities</u>: The marginal benefit of buying one gallon of unleaded gasoline is $7 while the marginal (private) cost to the driver is $3 + 0.01Q. The marginal social cost includes the private cost plus a negative externality equal to $1/gallon. Which **TWO** of the following are **TRUE**:
a) To properly internalize the externality, the government should have a gasoline tax of $1/gallon.
b) To properly internalize the externality, the government should have a gasoline tax of $0.01/gallon.
c) The socially optimal quantity of gasoline consumption, Q_s, is 300.
d) The socially optimal quantity of gasoline consumption, Q_s, is 500.

e) The free market quantity of gasoline consumption, Q_m, is 300.

18. <u>Public Choice</u>: Suppose that there are three possible bond measures on the ballot for elementary school funding: Big Bond, Medium Bond, Small Bond. The costs of the winning measure will be shared equally among the voting groups and suppose that each group is willing to pay their share for their most preferred choice. Further, suppose that the voters can be evenly divided into three groups: Married Couples, Single Adults, and Seniors. The preference rankings for these three groups are as follows:

	Married Couples	*Single Adults*	*Seniors*
Most Preferred	Big Bond	Medium	Small Bond
Preferred	Medium Bond	Small Bond	Medium Bond
Least Preferred	Small Bond	Big Bond	Big Bond

The election is set by pitting two measures at time with majority rule.

Which of the following **two** answers are **true**?

a) The above is an example of the impossibility theorem in public choice.
b) The above is an example of the median voter model.
c) The public has not clear preference ranking for the bonds.
d) The public does have a clear preference for the bonds.

19) <u>Moral Hazard</u>: Using the banking industry as an example, explain:

a) The characteristic:

b) The problem:

c) The solution:

d) The problem with the solution:

<u>Section II—Four Long problems. (84 points total)</u>
1. **(17pts) <u>Supply and Demand</u>:** The demand for toupees is equal to $Q_D = 1040 – 2P$, where P is the price of toupees, and Q_D is the number of toupees balding men demand at various prices.   Assume that the market is perfectly competitive.

a) (2pts) What is the inverse demand curve for toupees?

b) (3pts) Plot the market demand curve on the graph provided below:

c) (4pts) The cost of making toupees for any toupee maker is $C = 100 + q^2$. Derive
i) MC of production_____
ii) AC of production_____
iii) AFC of production _____
iv) AVC of production_____

d) (4pts) In the <u>long run</u>, how many toupees will each firm make and what will be the price of each toupee?

e) (4pts) In the long run, what will be quantity of toupees sold in the <u>entire market</u> and how many firms will be in the market?

2. **(13pts) <u>Consumer Choice Model</u>**
(a) (3pts) A consumer has income of $4,000. Tacos cost $4 each and beer costs $2 per bottle. Placing tacos on the y-axis and beers on the x-axis, draw the consumer's budget constraint line. On the same graph, draw an indifference curve that establishes the combination of tacos and beer that optimizes the consumer's utility. (Remember to label, including T* and B*)

(b) (2pts) Describe in words why this is considered the optimum?

(c) (1pt) What is the slope of this budget constraint line?

(d) (2pts) Suppose that at the optimum this consumer receives 24 utils of marginal utility from his last consumed bottle of beer, how many utils of satisfaction does he receive from his last consumed taco?

(e) (5pts) Suppose the price of beer falls to $1 per bottle. Show what happens to the consumption of tacos and beers. Assume that beer is a normal good. Show the substitution and income effects. (Fully label and explain your graph)

2) **(12pts) <u>Long-Run Production and Costs:</u>** Kemal is a producer of drumsticks. There are two inputs needed to make drumsticks: Wood (K) and labor (L). Wood costs $5 per pound of wood and labor cost $10 per unit of labor. The production function for Kemal is given by $q = 60K - 0.5K^2 + 40L - 0.5L^2$. Currently Kemal has an expenditure constraint (budget) equal to $500.

a) (8pts) Derive the profit-maximizing level of Wood (K*) and Labor (L*) for Kemal, subject to his expenditure constraint of $500.

b) (4pts) Draw the isocost and isoquant showing the optimum input allocation at your L* and K*. (Put Wood (K) on the y-axis and Labor on the x-axis. Label everything! Write the actual numbers wherever you can.)

4. **(14pts) <u>Oligopoly</u>**: Suppose that Scottsdale, Arizona has only two suppliers of pool covers. Pool covers are homogeneous. The demand for pool covers in Scottsdale is P=250-Q. Each firm has MC=$30 and no fixed costs.

a) (3pts) <u>Cartel</u>: What is the quantity and price each would produce and charge for their pool covers if they formed a cartel and shared equally in the profits.

b) (8pts) <u>Cournot</u>: What are the quantities produced by each and the market price if they are Cournot duopolists?

b) (3pts) <u>Bertrand</u>: What is the quantity and price each would produce and charge for their pool covers if they were competing as Bertrand duopolists?

5. (18pts) <u>Monopoly and Price Discrimination</u>: Suppose the demand curve for a monopolist is P=200-2Q. Marginal cost of $10/unit and no fixed costs.

a) (3 pts) Calculate the monopolist's profit maximizing output and price.

b) (3 pts) At Q*, calculate profits for the monopolist.

c) (8pts) Now suppose this monopolist can engage in a block pricing scheme, i.e., dividing its customer into two separate segments and charging them different prices. What would be the profit maximizing prices and quantities for each segment?

d) (4pts) Now suppose this monopolist can perfectly price discriminate, how much profit would the monopolist make?

6. (10pts) <u>Externalities</u>: Identify the type of externality in the graph below:
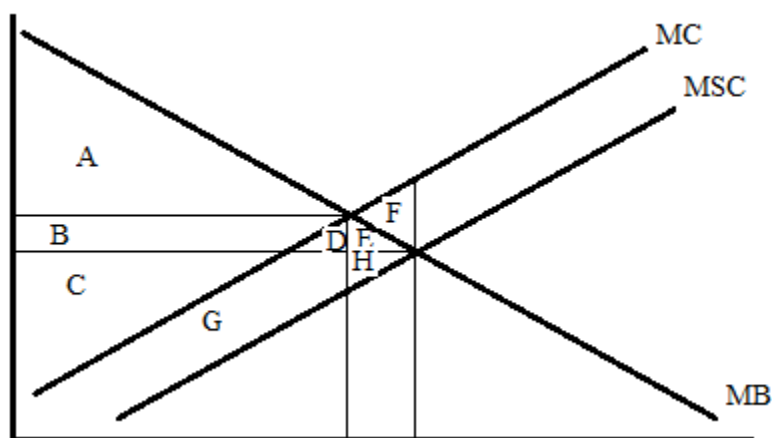
A) Label the market price and quantity. Label the socially optimal price and quantity.

B) At the *free-market* level of production, calculate the following::

a) Consumer Surplus:_____

b) Producer Surplus:_____
c) Externality Benefit:_____
d) Social Welfare:_____

At the *socially optimal* level of output, calculate the following:

e) Consumer Surplus:_____
f) Producer Surplus:_____
g) Externality Benefit:_____
j) Social Welfare:_____

Determine the deadweight loss from the externality. _____