

ECON 0100
Spring 2023
Midterm 2
March 28, 2023
Time Limit: 60 Minutes

Name (Print): _____

Penn ID number: _____
(8 digits)

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- This exam contains 8 pages (including this cover page) and 10 questions. Check to see if any pages are missing.
 - The exam is scheduled for 1 hour.
 - The total score is 26 points.
 - This is a closed-book, closed-note, no calculator exam.
 - Answer each multiple-choice question by filling in the bubble for the answer you select. Make sure that the bubble is clearly filled in, or it will be marked incorrect.
 - Write your answers to the short answer questions in the spaces provided for them. Do not write your answers outside of the boxes.
 - Do not remove any pages or add any pages.
 - No additional paper is supplied
 - Show your work when asked. Label all graphs carefully.
 - This exam is given under the rules of Penn's Honor system.

My signature certifies that I have complied with the University of Pennsylvania's Code of Academic Integrity in completing this examination.

Please sign here _____ Date _____

Multiple Choice Questions (best 7 out of 8: 10.5 points)

- (1½ points) Supply and demand for swords in Númenor are given by $Q_S = P - 2$ and $Q_D = 10 - P$ respectively. Under pressure from the Guild of Weaponsmiths, the king decides to impose a price floor $P_F = 8$. Which of the following is true?

 - With the price floor, the quantity sold is 2 units.**
 - The price floor is not binding.
 - The price floor decreases the quantity sold by 3 units.
 - None of the above.
- (1½ points) Suppose a city government passes a rent control law and imposes a price ceiling on the rental market below the equilibrium price. Which of the following *can be* a consequence of this policy change ?

 - An excess supply of rental housing.
 - A drop in the quantity demanded
 - A shortage of rental housing**
 - Sellers of the product are made better off
- (1½ points) Egg prices have skyrocketed in the past year, due to higher production costs and an avian flu outbreak. In the U.S., the average price of a dozen eggs increased from \$1.78 in December 2021 to \$4.25 in December 2022. Suppose the government decides to subsidize eggs, to bring the price paid by consumers down to December 2021 levels. Assuming upward sloping supply and downward sloping demand in the market for eggs, the subsidy will be:

 - \$2.47 per dozen
 - More than \$2.47 per dozen**
 - Less than \$2.47 per dozen
 - There is not enough information to identify the level or range of the subsidy
- (1½ points) Tom and Peter can produce soap or brushes. Tom can produce at most 12 soap bars or 6 brushes, while Peter can produce at most 28 soap bars or 7 brushes. The world price of one brush is 3 soap bars. Suppose Tom and Peter jointly produce and then trade with the rest of the world. How many soap bars can they consume at most if they engage in trade?

 - 28
 - 40
 - 46**
 - Not enough information
- (1½ points) Consider the market for potatoes in Germany. Inverse demand is given by $P = 10 - Q_D$ and inverse supply is $P = Q_S$. The world price is denoted by P_W . Under which world prices can Germany engage in free trade and realize a higher total surplus compared to autarky and no trade?

I. $P_W = 2$

II. $P_W = 4$

III. $P_W = 6$

IV. $P_W = 8$

I. only

II. only

III. only

IV. only

I. and II.

III. and IV.

I., II., III. and IV.

6. ($1\frac{1}{2}$ points) Assume the US market for candy has demand given by $P = 20 - Q_D$ and supply $P = Q_S$. The country engages in international trade. The current world price is \$5. The government introduces a per-unit subsidy to domestic producers. After the subsidy is introduced, imports decrease to 5 units. What is the amount of the per-unit subsidy?

1

2

3

4

5

7. ($1\frac{1}{2}$ points) Consider the housing market in West Philadelphia, where inverse demand is $P = 10,000 - Q_D$ and quantity supplied is fixed at $Q_S = 2000$. Penn State has found recruiting students to State College increasingly difficult, and thus has decided to open up a branch in West Philadelphia. The presence of Penn State students in West Philadelphia generates a marginal external cost on the neighborhood $MEC = Q$. The Philadelphia City Council wants to assure efficiency in West Philadelphia housing market. Which of the following policies *can* lead to the efficient level of output?

I. A per-unit tax on housing

II. A binding price floor on housing

III. Doing nothing

I. only

II. only

III. only

I. and II.

II. and III.

I. and III.

I., II and III.

8. ($1\frac{1}{2}$ points) Yannick just renewed his contract with the Philadelphia Orchestra. To celebrate, City Hall decides to build a fountain next to the Kimmel Center and name it after Yannick. The fountain can be 1-tier, 2-tier or 3-tier. Suppose there are 2 residents who value the fountain differently: Jim, a neighbor of the Kimmel Center has a marginal benefit $MB_J = 4 - n$, and Liz, an occasional visitor has a marginal benefit $MB_L = 4 - 2n$, where n is the number of tiers. The marginal cost of each tier is $MC = 1$. What is the socially efficient number of tiers for the fountain?

0

1

2

3

Short Answer Questions (15.5 points total)

To get any point you must show your work

9. Consider two small economies with different sized work forces, Liberio and Karifa. The following table shows how many Takis or Boba each economy can produce, given its total number of workers:

	Takis	Boba	Number of workers
Liberio	400	200	100
Karifa	600	200	200

(a) Given the table above:

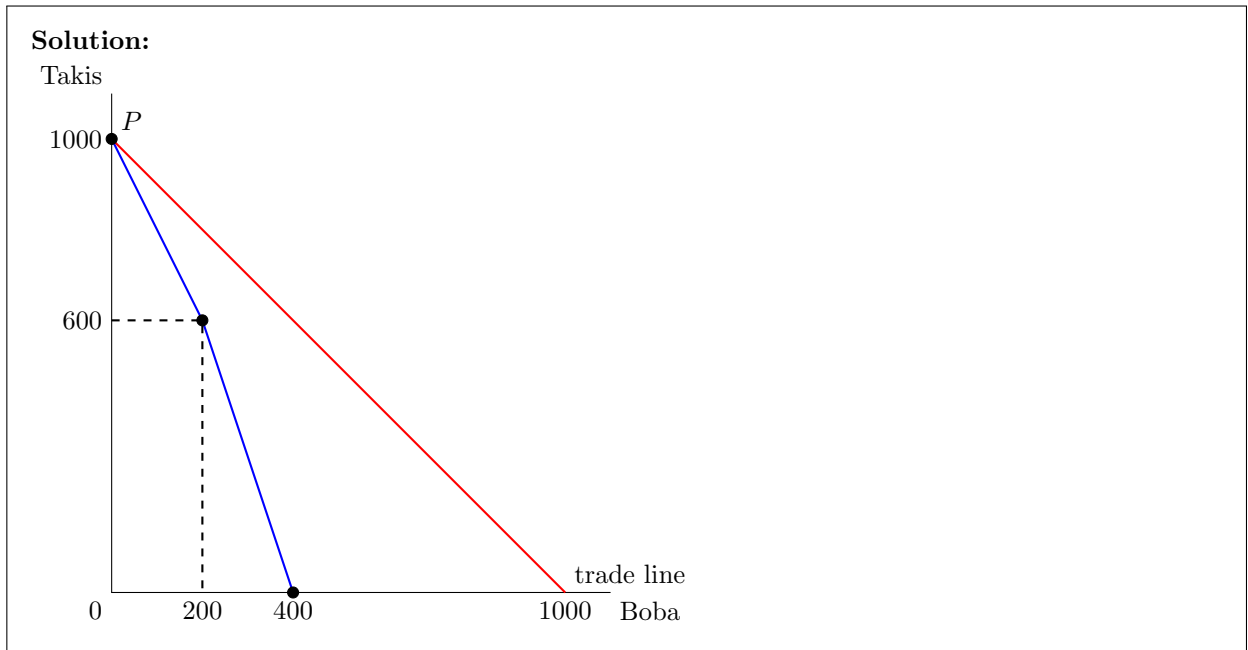
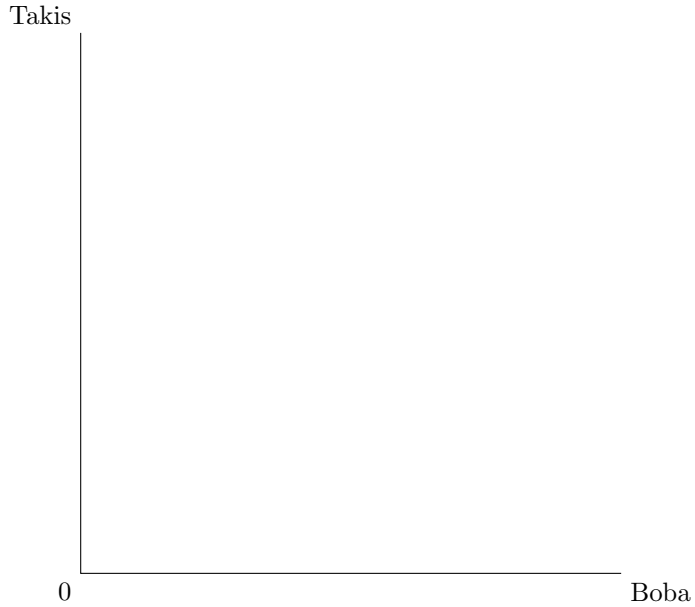
- The absolute advantage in Takis belongs to **Liberio**
- The absolute advantage in Boba belongs to **Liberio**
- The comparative advantage in Takis belongs to **Karifa**
- The comparative advantage in Boba belongs to **Liberio**

Solution: Production per worker is 4 Takis or 2 Boba for Liberio, and 3 Takis or 1 Boba for Karifa. Liberio can produce more of both goods per worker, so it has an absolute advantage in both goods. Opportunity cost of 1 Boba is 2 Takis for Liberio, and 3 Takis for Karifa, so Liberio has a comparative advantage in Boba, and Karifa has a comparative advantage in Takis.

- (b) Assume that 1 unit of Takis is worth the same as 1 unit of Boba. Would Liberio and Karifa benefit from trading *with each other*? Why or why not?

Solution: No. Terms of trade need to be 1 Boba to at least 2 Takis and at most 3 Takis for both of them to benefit from trade. If the price of 1 Boba is 1 Taki, it is too low for Liberio to benefit.

- (c) Suppose that Liberio and Karifa agree to form a trade alliance and become Marley Trade Alliance (MTA). Draw their *joint* PPF on the graph below. For full credit, label all intercepts, kinks, and slopes.



- (d) Assume MTA now trades with the rest of the world at the same prices as before, with each unit of Takis worth 1 unit of Boba. In the graph above, draw the trade line of MTA, and label its optimal production point P .

Solution: See graph.

For the remainder of the question, suppose Takis and Boba are consumed as perfect complements in MTA, at a ratio of 1 for 1.

- (e) Given their optimal production point P , what quantities of Takis and Boba does MTA optimally consume? Show your work in the box below.

Solution: The Consumption point is on the trade line (whose slope is -1). Since the two goods are consumed as perfect complements, its y intercept and x intercepts are both equal to x , such that $1000 - x = x$ so $x = 500$. So MTA consume 500 Takis and 500 Boba.

Following powerful lobbying by domestic producers in the importing market, MTA has decided to **ban free trade with the rest of the world**.

- (f) Without trade, what are MTA's production and consumption points? Explain in the box below.

Solution: The production and consumption points are the same, on the second portion of the PPF (whose slope is -3). Since the two goods are consumed as perfect complements, the y-intercept and x-intercepts are both equal to x , such that $600 - x = 3(x - 200)$ so $4x = 1200$, i.e. $x = 300$. So MTA produces and consumes 300 Takis and 300 Boba.

- (g) Consider domestic consumers and domestic producers of Boba and Takis. Who will benefit from the ban on free trade? Who will be hurt? Explain in the box below.

Solution: MTA produces more Boba, less Takis, so Boba producers benefit Taki producers suffer. Consumers consume less of both goods so they suffer.

10. Consider the perfectly competitive market for fast food, with demand $P = 50 - 4Q_D$ and supply $P = 20 + Q_S$. According to a recent study, fast food packaging accounts for 88% of world's coastline litter and cause a danger for ocean ecosystems. Suppose the *consumption* of fast food generates a marginal external cost $MEC = Q$.

- (a) Suppose the market is not regulated. In equilibrium, the market quantity is $Q_M =$ 6.

Solution: To find the market's equilibrium we need to make the private marginal cost equal to the private marginal benefit: $50 - 4Q = 20 + Q$ yields $Q_M = 30/5 = 6$.

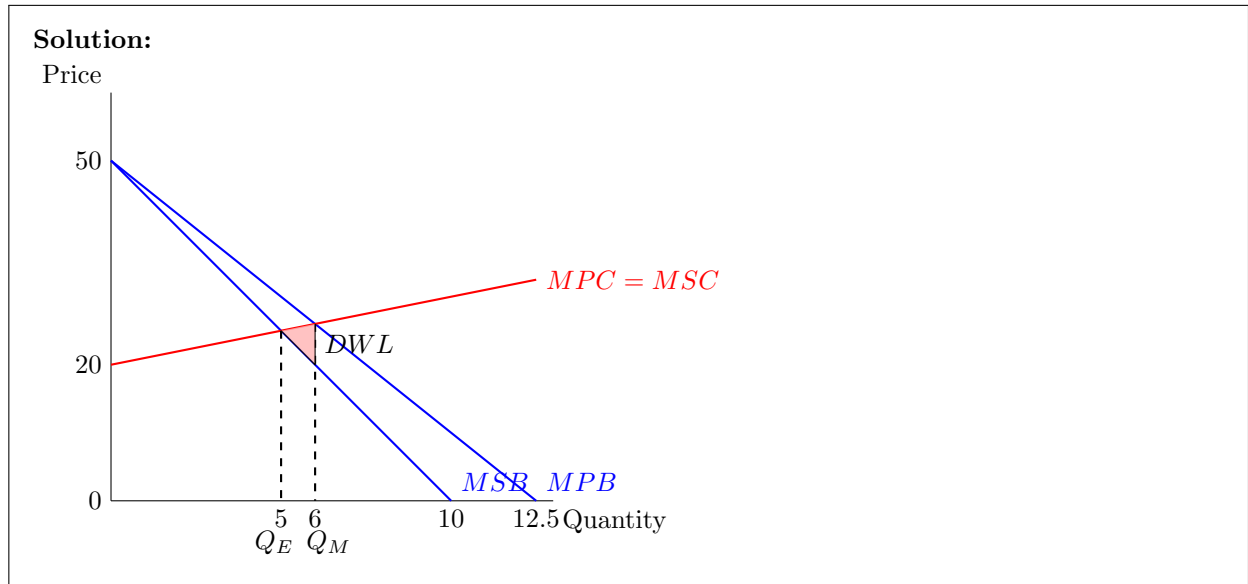
- (b) The marginal social benefit equation is $MSB =$ $50 - 5Q$

- (c) The socially efficient quantity is $Q_E =$ 5.

Solution: $MSB = MPB - MEC = 50 - 4Q - Q = 50 - 5Q$. To find the socially efficient quantity, we set $MSB = MSC$: $50 - 5Q = 20 + Q$, which yields $Q_E = 5$.

- (d) In the graph below, draw:

- Draw Marginal private benefit MPB , Marginal private cost MPC , Marginal social benefit MSB , Marginal social cost MSC . Label all intercepts and curves.
- Label the market quantity Q_M and socially efficient quantity Q_E



- (e) On the graph above, shade the deadweight loss generated by the market quantity and label it DWL .

Solution: See graph.

- (f) Suppose the government imposes a corrective tax of t per unit of fast food, in order to reach the socially efficient quantity. What should the tax t be? Show your work in the box below.

Solution: The tax should be equal to the marginal external cost at the socially efficient quantity. Since $MEC = Q$, and $Q_E = 5$, the tax should be equal to 5.

- (g) Suppose the government wants to use a binding price floor P_F instead of a tax to reach the socially efficient quantity. What should the price floor P_F be? Show your work in the box below.

Solution: With a binding price floor, the short side of the market is the demand side, so the price floor should be set such that the quantity demanded is equal to the socially efficient quantity. According to the demand equation, $P = 50 - 4Q_D$, so the price floor should be equal to $50 - 4Q_E = 30$.