

Economics 101
Spring 2022
April 19, 2022
Midterm Exam 2

Name Annotated Key
TA Name _____
Discussion Section # _____
Student ID # _____

VERSION 1

**DO NOT BEGIN WORKING UNTIL THE INSTRUCTOR TELLS YOU TO DO SO.
READ THESE INSTRUCTIONS FIRST.**

You have 90 minutes to complete the exam, including filling in your scantron. The exam consists of 9 binary choice questions worth 1 point each and 30 multiple choice questions worth 3 points each for a total of 99 points. The last point is administrative - you get it if you fill out the scantron properly. Answer all questions on the scantron sheet with a #2 pencil. There are 27 printed pages in this exam, including this cover sheet. Do not pull the exam apart or remove the staple.

WARNING: NO COMMUNICATION OR CALCULATING DEVICES, OR FORMULA SHEETS ARE ALLOWED. NO CONSULTATION AND CONVERSATION WITH OTHERS ARE ALLOWED WHILE YOU ARE TAKING THE EXAM OR IN THE EXAM ROOM. ACADEMIC MISCONDUCT IS A SERIOUS OFFENSE AND PUNISHABLE TO THE FULLEST EXTENT.
PICK THE BEST ANSWER FOR EACH QUESTION.

How to fill in the scantron sheet and other information:

1. Print your last name and first name in the spaces marked "Last Name," and "First Name". Fill in the corresponding bubbles below.
2. Print your student ID number in the space marked "Identification Number." Fill in the bubbles.
3. Write **the number of the discussion section you've been attending under "Special Codes" spaces ABC,** and fill in the bubbles. The discussion numbers can be found at the bottom of this page.
4. Write the **version number** of your exam booklet **under "Special Codes" space D,** and fill in the bubble. The version number is at the top of this page.

Example: If you are registered for section 361 and it says "VERSION 2" at the top of this page, your "Special Codes" should read 3612.

- If there is an error on the exam or you do not understand something, make a note on your exam booklet and the issue will be addressed AFTER the examination is complete. No questions regarding the exam can be addressed while the exam is being administered.
- When you are finished, please get up quietly and bring your scantron sheet and this exam booklet to the place indicated by the instructors.

Zau Aitkulova 306 F 8:50 – 9:40 am Soc Sci 4322	Giselle Labrador Badia 301 TR 4:35 – 5:25 pm Soc Sci 4332	Angela Jiang 302 F 2:25 – 3:15 pm Ingraham 225
310 F 12:05 – 12:55 pm Ingraham 222	304 F 1:20 – 2:10 pm Soc Sci 4314	303 F 1:20 – 2:10 pm Van Hise 399
	307 F 9:55 – 10:45 am Van Hise 209	305 F 11:00 – 11:50 am Soc Sci 4322
	309 F 11:00 – 11:50 pm Van Hise 387	308 F 9:55 – 10:45 am Sterling 2333

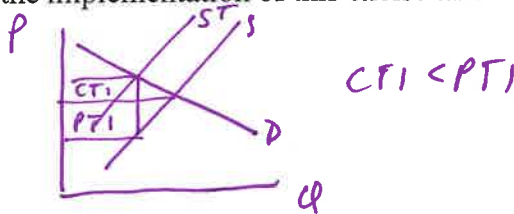
I, _____, agree to neither give nor receive any help on this exam from others. I understand that the use of a calculator or communication device on this exam is academic misconduct. I also understand that providing answers to questions on this exam to other students is academic misconduct, as is taking or receiving answers to questions on this exam from other students. Thus, I will not expose my answers to other students. It is important to me to be a person of integrity and that means ALL ANSWERS on this exam are my answers. Any violation of these guidelines will result in a penalty of at least receiving a zero on this exam.

Signed _____

Binary Choice Questions (9 questions worth 1 point each)

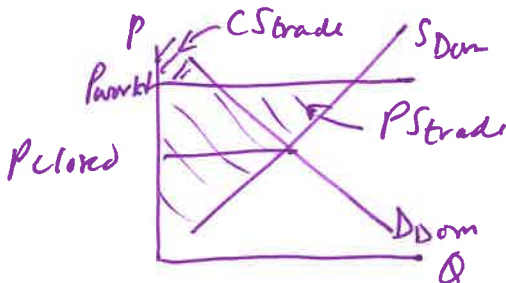
1. The government implements an excise tax in a market where the demand curve is relatively more elastic than the supply curve. Given this information and holding everything else constant, you conclude that the:

- a. Consumer tax incidence from the implementation of this excise tax is greater than the producer tax incidence from the implementation of this excise tax.
- b. Producer tax incidence from the implementation of this excise tax is greater than the consumer tax incidence from the implementation of this excise tax.



2. Suppose that a market is closed to trade and the world price for this good is currently greater than the closed market price for the good. Given this information and holding everything else constant, if this market opens to trade, then:

- a. Domestic Producers will benefit from this change in the market.
- b. Domestic Consumers will benefit from this change in the market.



SOME THOUGHT

3. Suppose that a market is open to trade and that a tariff has been placed on this good. If this tariff is effective in this market, we know:

- a. That the tariff price must be less than the equilibrium price if this market is a closed economy and greater than the world price if this market is an open economy. *True*
- b. That the tariff price must be greater than the equilibrium price if this market is a closed economy and less than the world price if this market is an open economy. *False*

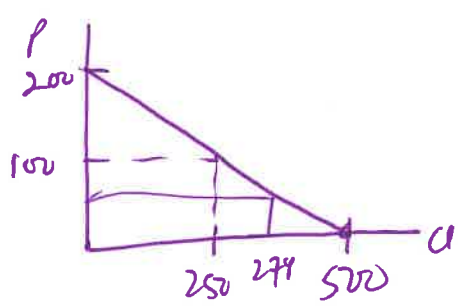
SOME THOUGHT

4. Consider a firm that has the following demand curve for its product where Q is the quantity of units and P is the price per unit:

Market Demand: $Q = 500 - (5/2)P$

Currently in this market 274 units are being sold. If the firm's only goal is to increase its revenue you would advise this firm to:

- a. Raise the price of the good to as high a level as possible. \Rightarrow if $P=200$, then $Q=0$ & $TR=0$
- b. Sell no more than 250 units of the good. \rightarrow at $Q=250$, TR is maximized



$$\frac{5}{2}P = 500 - Q$$

$$P = \frac{2}{5}[500 - Q]$$

$$P = 200 - \frac{2}{5}Q$$

DEFN.

5. When the price of the good increases holding everything else constant, we know that the individual's purchasing power has:

- a. Decreased.
- b. Increased.

NOT HARD

6. The City of Elvira finds that its metro bus system is not covering its total costs of operation. The City of Elvira knows that the price elasticity of demand for bus rides is 2.38. Given this information and holding everything else constant, the City of Elvira can reduce its losses by:

- a. Increasing the price of each bus ticket.
- b. Decreasing the price of each bus ticket.

$$E = 2.38 = \frac{\% \Delta Q^D}{\% \Delta P} = \text{D is elastic}$$

if $P \downarrow$, $TR \uparrow$ when D is elastic

NOT HARD

7. Joe is currently selling 50 T-shirts per day at his business. He plans to have a sale on Saturday where T-shirts are sold at 25% off their original price. He knows that his cross price elasticity of demand for T-shirts and shorts is equal to -1.5, and his price elasticity of demand for T-shirts is equal to 4. Given this information and holding everything else constant, you predict that Joe will sell:

- a. 100 T-shirts on Saturday.
- b. Approximately 69 T-shirts on Saturday.

$$E_{xy} = -1.5 = \frac{\% \Delta Q_{T\text{-shirts}}}{\% \Delta P_{\text{shorts}}} \left\{ \begin{array}{l} \text{Don't} \\ \text{need this} \\ \text{info} \end{array} \right.$$

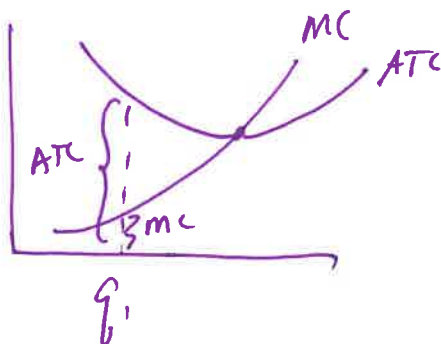
$$E = \left| \frac{\% \Delta Q_{T\text{-shirts}}}{\% \Delta P_{T\text{-shirts}}} \right| = 4$$

100% \uparrow in $Q_{T\text{-shirts}}^D$
 \hookrightarrow 50 t-shirts \rightarrow 100 t-shirts

SOME THOUGHT

8. If the average total cost of producing a good is greater than the marginal cost of producing the next additional unit of the good, then:

- a. The average total cost is decreasing as output increases.
- b. The marginal total cost of producing an additional unit decreases as output increases.



$MC < ATC$ then $ATC \downarrow$ as $Q \uparrow$

NOT HARD

9. Consider a perfectly competitive market that is currently in short run equilibrium. You are told that the market price is greater than the representative firm's ATC at the current equilibrium. Given this information and holding everything else constant, you predict that in the long run:

- a. The market supply curve will shift to the right.
- b. The market supply curve will shift to the left.

in SR, if $P > ATC \Rightarrow \Pi_{firm} > 0$

in LR expect entry of firms \Rightarrow mkt S shifts to right

Multiple Choice Questions (30 questions worth 3 points each)

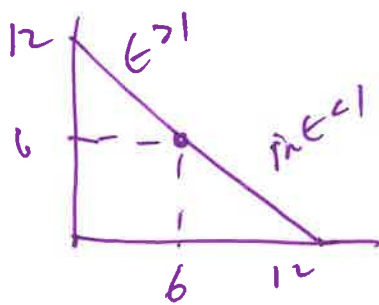
10. Demand for good X is given by the following equation where P is the price per unit and Q is the number of units of the good:

$$P = 12 - Q$$

Given this information and holding everything else constant, which of the following statements is a true statement?

- a. Price elasticity of demand between $P = 4$ and $P = 5$ is more than one. X
- b. Price elasticity of demand between $P = 10$ and $P = 11$ is less than one. X
- c. Price elasticity of demand between $P = 10$ and $P = 11$ is equal to one. X
- d. Price elasticity of demand between $P = 4$ and $P = 5$ is less than one.

can't get this from graph



if $P_1 = 4, Q_1 = 8$
if $P_2 = 5, Q_2 = 7$

But here's the proof.

$$E = \left| \frac{\frac{Q_2 - Q_1}{Q_2 + Q_1}}{\frac{P_2 - P_1}{P_2 + P_1}} \right| = \left| \frac{\frac{7 - 8}{15}}{\frac{5 - 4}{9}} \right| = \frac{\frac{1}{15}}{\frac{1}{9}}$$

$$E = \frac{1}{15} \left(\frac{9}{1} \right) = \frac{9}{15} < 1$$

Use the table below to answer following **THREE (3)** questions.

L is labor, K is capital, MP_L is the marginal product of labor, FC is fixed cost, and TC is total cost. You are also told that the price of a unit of labor is \$200.

L	K	Q	MP_L	FC	TC
0	4	0	---	\$200	\$200
1	4	6		200	F
3	4	12		200	
6	4	18		200	P

VC TC
 0 $F=400$
 200 $P=1400$
 600
 1200

$MP_L = \frac{\Delta Q}{\Delta L}$

MP_L

$6/1=6$
$6/2=3$
$6/3=2$

DEFN

11. Which of the following represents column MP_L ?

a.

MP_L
-
6
4
3

c.

MP_L
-
6
3
2

b.

MP_L
-
6
12
18

d.

MP_L
-
1.5
3
4.5

NOT HARD

12. Recall that the price of a unit of labor is \$200. Given this information and holding everything else constant, what are the values for F and P in the above table?

a. $F = \$200$; $P = \$800$

b. $F = \$200$; $P = \$1200$

c. $F = \$400$; $P = \$1400$

d. $F = \$400$; $P = \$1200$

EASY

13. Suppose this firm produces 12 units of the good and sells each unit of the good at a price of \$100. Given this information and holding everything else constant, what is the firm's profit?

a. \$1400

b. \$1200

c. \$800

d. \$400

$TR = P \cdot d = 100(12) = \1200
 $TC = FC + VC = 200 + 600 = 800$
 $\pi = TR - TC = 1200 - 800 = 400$

SOME THOUGHT

14. Suppose UW-Madison starts paying all of its enrolled students the same scholarship every month. That means all enrolled students' incomes increased. As a result of this scholarship payment, the demand for bus rides in Madison decreases. Given this information and holding everything else constant, which of the following statements is true about bus rides in Madison?

- a. Bus rides are an inferior good for UW-Madison students and the income elasticity of demand is a positive number. ✓
- b. Bus rides are a normal good for UW-Madison students and the income elasticity of demand is a negative number. ✗
- c. Bus rides are a normal good for UW-Madison students and the income elasticity of demand is a positive number. ✗
- d. Bus rides are an inferior good for UW-Madison students and the income elasticity of demand is a negative number. ✓

$Inc \uparrow, Q_{Busrides}^D \downarrow \Rightarrow \text{Bus rides inferior good}$

$$E_I = \frac{\% \Delta Q^D}{\% \Delta I} = \frac{-}{+} < 0 \text{ if inferior good}$$

SOME WORK

15. You are told the following information:

- The price of good Y increases by half its original amount;
- The cross-price elasticity between good X and good Y is $-1/2$; and
- The initial quantity demanded of good X is 4 units.

Given this information and holding everything else constant, what is the quantity demanded of good X after the change in good Y's price?

- a. 1 unit of good X will be demanded after the change in the price of good Y
- b. 2 units of good X will be demanded after the change in the price of good Y
- c. 3 units of good X will be demanded after the change in the price of good Y
- d. 5 units of good X will be demanded after the change in the price of good Y

50% ↑ in Price of Good Y

$$E_{XY} = -\frac{1}{2} = \frac{\% \Delta Q_X^D}{\% \Delta P_Y} = \frac{\% \Delta Q_X^D}{50\%} = -\frac{1}{2}$$

$$\% \Delta Q_X^D = \frac{-50}{2} = -25\%$$

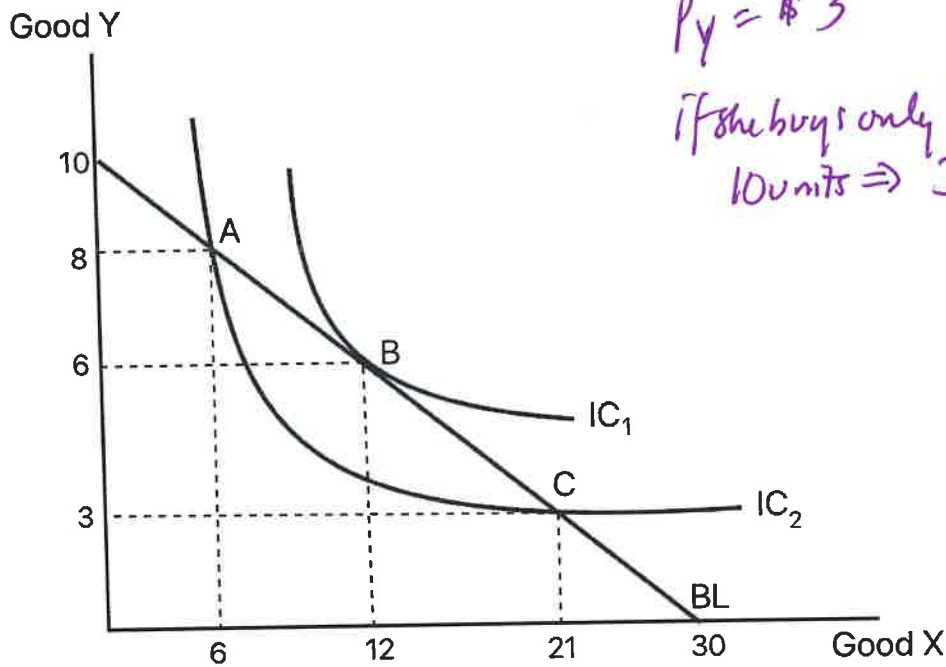
↓ in Q^D of good X by 25%

↳ $Q_X^D = 4$

$Q_X^D = 3$

Use the following information to answer the next **THREE** (3) questions:

Consider the following graph depicting Megan's budget line, BL, and two of her indifference curves, IC1 and IC2. Point B represents where the budget line, BL is tangent to the indifference curve IC1. The indifference curve IC2 intersects the budget line BL at Point A and Point C. Assume that Megan has income to be spent on good X and good Y and that the price of good Y is \$3 per unit.



$P_Y = \$3$

if she buys only Y she can afford 10 units \Rightarrow Inc = $3(10) = \$30$

Process of elimination should get you to (d)

16. Given this information and holding everything else constant, which of the following statements is true?

- a. The bundle of goods X and Y at Point A is preferred by Megan over the bundle of goods X and Y at Point B. *No, pt A is on a lower IC*
- b. There are an infinite number of indifference curves that include the bundle of goods X and Y at Point C. *No, there is one IC that goes through pt C*
- c. Megan could have greater utility if she chooses a different bundle of goods X and Y than that depicted at Point B. *No, pt B is on an IC just tangent to her bud get line; she is max. her utility*
- d. At Point A, the marginal utility of Good X is greater than the marginal utility of Good X at Point C.

$\text{slope at A} > \text{slope at B}$
 $\frac{MU_X}{MU_Y} > \frac{MU_X'}{MU_Y'}$

17. Given this information and holding everything else constant, which of the following statements is true?

- a. Megan's income is \$10 and the price of Good X is \$(1/3) per unit.
- b. Megan's income is \$10 and the price of Good X is \$1 per unit.
- c. Megan's income is \$30 and the price of Good X is \$1 per unit. ✓
- d. Megan's income is \$30 and the price of Good X is \$(1/3) per unit.

if Inc = \$30 & Megan only buys good X she can afford 30 units $\Rightarrow \frac{\text{Income}}{\text{Price of good X}} = 30$

$\frac{30}{\text{price of good X}} = 30$
 $\text{price of good X} = \1

18. If Megan's income is cut in half, the marginal rate of substitution (that is, the slope of the indifference curve) of Good X for Good Y at her optimal consumption bundle is:

- a. -1/6
- b. -1/3
- c. -2/3
- d. -3/2

Income' = 15

at optimal pt

$$\frac{MU_x}{MU_y} = \frac{P_x}{P_y}$$

$$\text{slope of IC} = \text{slope of BL} = -\frac{\$1}{\$3}$$

is a negative #!

Use the following information to answer the next **FOUR (4)** questions:

Consider a fictional country, Metallia, which produces titanium. The domestic demand and supply for titanium are given by the following equations where Q is the quantity of pounds of titanium and P is the price per pound of titanium:

Domestic Demand: $Q = 30 - P$
 Domestic Supply: $Q = 2P$

$30 - P = 2P$
 $30 = 3P$
 $10 = P$

The price is measured in dollars per pound of titanium. Suppose that Metallia's titanium market is open to international trade so that people can buy and sell unlimited quantities of titanium from abroad. The world price of titanium is \$6 per pound of titanium.

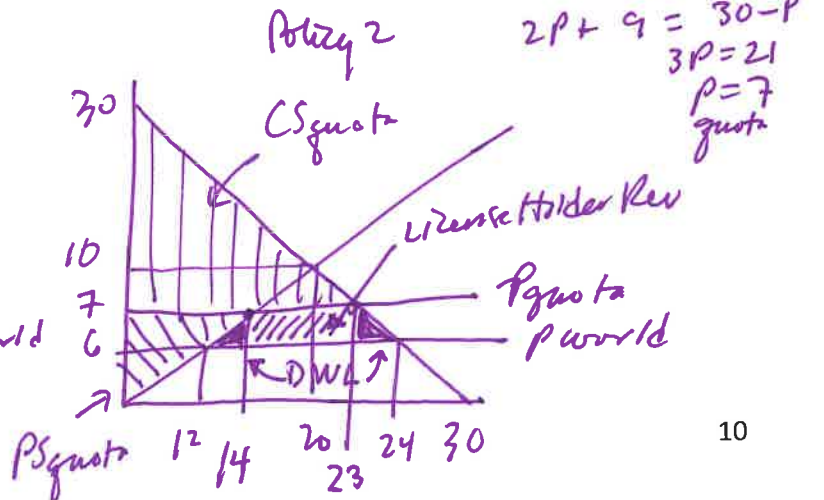
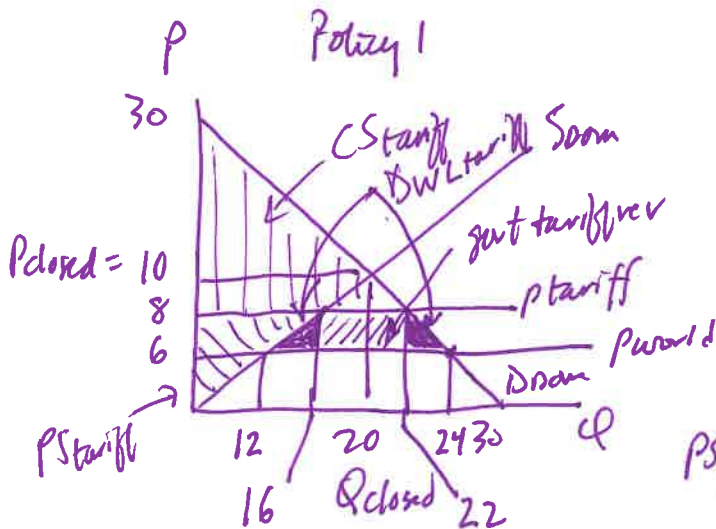
The government is considering the following two policies to deal with the repercussions of an open economy in this market:

- Policy 1: Imposition of a tariff of \$2 per pound on titanium in this market.
- Policy 2: Imposition of an import quota of 9 pounds of titanium in this market.

Not too Hard

19. Given this information and holding everything else constant, which of the following statements is true about the titanium market in Metallia when this market is open to international trade and there is no government policy intervention?

- a. If this market opens to trade, consumers will be worse off since the domestic quantity supplied will fall to 12 pounds from the closed economy level of 20 pounds. *False*
- b. If this market opens to trade, then imports will account for half of the quantity demanded in the market. $Q_{Dom} = 12$ $Q^D = 24$ $Imports = Q^D - Q^S = 24 - 12 = 12$ *True !!*
- c. If this market opens to trade, the price in the market will be \$6 per pound and domestic consumers will consume 12 pounds of titanium. *Dom consumers will consume 24 pounds - False*
- d. If this market opens to trade, the country will export titanium and domestic consumers will consume 24 pounds of titanium. *False* \rightarrow no - they will import $Q^S + Imports = Q^D$



SOME WORK

20. Suppose the government decides to implement Policy 1, a tariff of \$2 per pound of titanium. Given this information and holding everything else constant, what is the government's revenue from the implementation of this tariff?

- a. \$6
- b. \$8
- c. \$12
- d. \$16

$$\begin{aligned} \text{Govt tax revenue} &= (\text{tariff/unit}) (\# \text{ of units imported}) \\ &= (\$2/\text{unit}) (22 - 16) \\ &= \$12 \end{aligned}$$

MORE WORK

21. This question asks you to compare the outcomes from Policy 1 to the outcomes from Policy 2. Given this information and holding everything else constant, which of the following statements is true?

- a. License Holder Revenue with Policy 2 is greater than Government Tariff Revenue with Policy 1. *False*
- b. Policy 1 results in consumers consuming more units of the good than does Policy 2. *False*
- c. Consumer surplus increases by \$15 when the government switches from Policy 1 to Policy 2.
- d. The value of producer surplus under Policy 2 is smaller than the value of producer surplus under Policy 1. *Clearly true see graph*

Policy 1

$$\begin{aligned} \text{Govt tariff rev} &= \$12 \\ \text{Consumers consume } & 22 \text{ units} \\ \text{CS} &= \frac{1}{2} (30 - 8)(22) = 11(22) \end{aligned}$$

Policy 2

$$\begin{aligned} \text{License Holder Rev} &= (7 - 6)(23 - 14) = \$9 \\ \text{Consumers consume } & 23 \\ \text{CS} &= \frac{1}{2} (30 - 7)(23) \\ \text{CS} &= \frac{1}{2} (23)(23) \end{aligned}$$

↳ Lot of math here - I decided to see if there was an

MORE WORK

22. When comparing Policy 1 and Policy 2, what is true about the welfare implications of these two policies?

obviously true answer ⇒ there was! Answer (d)!

- a. Policy 1 has a same effect on consumer surplus, producer surplus and deadweight loss as Policy 2, with the only difference being that government revenue now becomes license holder revenue to the importers who have the right to import the good. *No, compare areas*
- b. Policy 1 results in less overall deadweight loss than Policy 2. *No, compare areas*
- c. Policy 1 results in a deadweight loss of \$6 while Policy 2 results in a deadweight loss of \$1.50
- d. All of the above statements are true about the welfare implication of these two policies.

DWL Policy 1

$$\begin{aligned} \text{DWL} &= \frac{1}{2} (8 - 6)(16 - 12) + \frac{1}{2} (8 - 6)(24 - 22) \\ \text{DWL} &= 4 + 2 = \$6 \end{aligned}$$

DWL Policy 2

$$\begin{aligned} \text{DWL} &= \frac{1}{2} (7 - 6)(14 - 12) + \frac{1}{2} (7 - 6)(24 - 23) \\ \text{DWL} &= (1) + \frac{1}{2} = \$1.50 \end{aligned}$$

A LITTLE
ABSTRACT

23. Suppose you are told that P is the price of the good, Q is the quantity of the good, TC is total cost, AC is average total cost, AFC is average fixed cost, and AVC is average variable cost. Given this information and holding everything else constant, which of the following formulas represents firm profit (π) correctly?

- a. $\pi = Q \cdot (P - TC)$
- b. $\pi = Q \cdot (P - ATC \cdot Q)$
- c. $\pi = Q \cdot (P - (AFC + AVC))$
- d. $\pi = Q \cdot (P - (AFC + AVC) \cdot Q)$

$$\pi = TR - TC$$

$$\pi = P \cdot Q - ATC \cdot Q \text{ rules out (a)}$$

rules out (b)

$$(c) \pi = Q \cdot (P - (AFC + AVC))$$

$$\pi = Q \cdot (P - [\frac{FC}{Q} + \frac{VC}{Q}])$$

$$\pi = Q \cdot [P - (FC + VC)]$$

$$\pi = P \cdot Q - (FC \cdot Q + VC \cdot Q)$$

$$\pi = TR - (FC \cdot Q + VC \cdot Q)$$

$$\pi = Q \cdot (P - (AFC + AVC))$$

$$\pi = Q \cdot (P - [\frac{FC}{Q} + \frac{VC}{Q}])$$

$$\pi = P \cdot Q - FC - VC$$

$$\pi = TR - TC \checkmark$$

but
 $TC \neq FC \cdot Q + VC \cdot Q$

A LITTLE
ABSTRACT

24. Suppose you are given the following production function where Q is the quantity of output, L is the number of units of labor and K is the number of units of capital:

$$\text{Production function: } Q = 2 \cdot L \cdot K$$

EXTRA QUESTION
NOT USED ON MIDTERM

Suppose that L and K increase by the same factor x such that the new labor input is xL and the new capital input is xK. As a result, Q increased by a factor of 4. Given this information and holding everything else constant, what is the value of x?

- a. 1
- b. 2
- c. 4
- d. 8

$$Q = 2LK$$

$$Q' = 2(xL)(xK)$$

$$Q' = 2x^2LK$$

$$Q' = x^2[2LK]$$

$$Q' = x^2[Q]$$

$$Q' = 4Q = x^2Q$$

$$4 = x^2$$

$$2 = x$$

Use following information to answer next **FOUR (4)** questions.

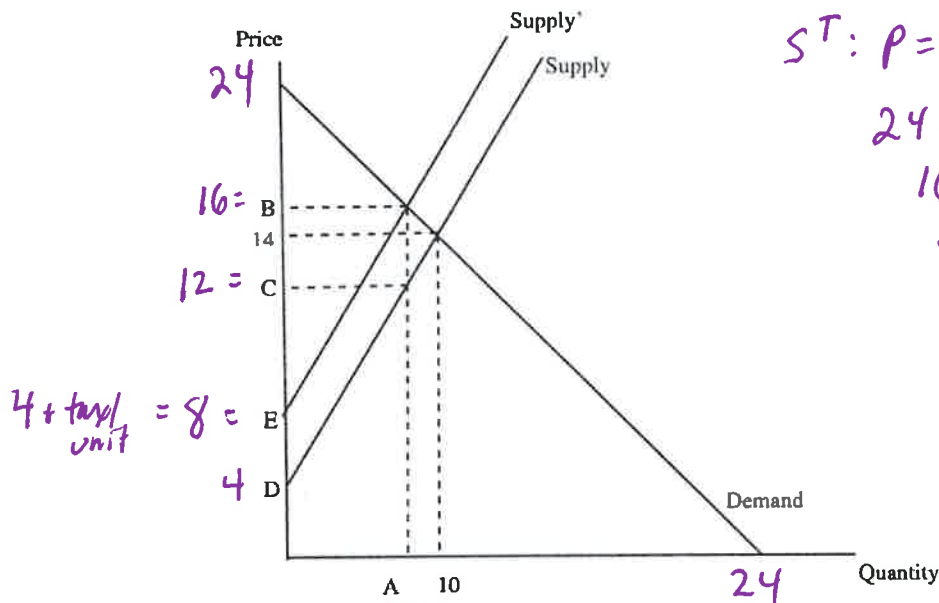
You are given the following demand and supply curves where P is the price per unit, Q_d is the quantity of units demanded, and Q_s is the quantity of units supplied.

Demand is given by: $Q_d = 24 - P$
 Supply is given by: $Q_s = P - 4$

$P = 24 - Q$
 $P = Q + 4$

NOT HARD

25. Suppose the government implements an excise tax on producers in this market of \$4 per unit of the good sold. The graph below illustrates this excise tax where “**Supply**” is the initial supply curve, “**Demand**” is the initial demand curve, and “**Supply'**” is the supply curve after implementation of the excise tax. Given this information and holding everything else constant, which of the following answers is true?



$S^T: P = Q + 8$
 $24 - Q = Q + 8$
 $16 = 2Q$
 $8 = Q$

$4 + \text{tax/unit} = 8 = E$
 $4 = D$

- a. A = 8 units; B = \$16 per unit; C = \$12 per unit; E = \$8 per unit; D = \$4 per unit ✓
- b. A = 8 units; B = \$15 per unit; C = \$11 per unit; E = \$4 per unit; D = \$2 per unit ✗
- c. A = 9 units; B = \$17 per unit; C = \$13 per unit; E = \$8 per unit; D = \$4 per unit ✗
- d. A = 9 units; B = \$15 per unit; C = \$10 per unit; E = \$6 per unit; D = \$2 per unit ✗

NOT HARD

26. Given the above information and holding everything else constant, calculate the consumer tax incidence (CTI) and the producer tax incidence (PTI). What percentage of the tax do consumers pay?

- a. 50% ✓
- b. 100%
- c. 0%
- d. 33.3%

$CTI = (16 - 14)(8) = 16$

$PTI = (14 - 12)(8) = 16$

$\frac{16}{32} = \frac{1}{2}$ or 50%!

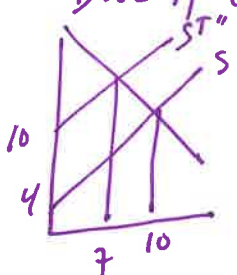
Total Tax Rev = 32

SOME THOUGHT

27. Suppose the government decides to remove the excise tax of \$4 per unit. The government implements a new excise tax of \$6 per unit. What is the difference in the deadweight loss between the excise tax of \$4 per unit and the excise tax of \$6 per unit?

- a. The excise tax of \$6 per unit increases the DWL by \$9 relative to the DWL when the excise tax is \$4 per unit.
- b. The excise tax of \$6 per unit increases the DWL by \$5 relative to the DWL when the excise tax is \$4 per unit. ✓
- c. The excise tax of \$6 per unit increases the DWL by \$16 relative to the DWL when the excise tax is \$4 per unit. ✗
- d. The excise tax of \$6 per unit increases the DWL by \$14 relative to the DWL when the excise tax is \$4 per unit. ✗

DWL if tax is \$4/unit = $\frac{1}{2}(16-12)(10-8) = \4



$S'': P = Q + 10$
 $D: P = 24 - Q$

$Q + 10 = 24 - Q$
 $2Q = 14$
 $Q = 7$

$\frac{1}{2}(6/unit)(10-7) = \text{DWL if tax is } \$6/unit$

$\$9 = \text{DWL if tax is } \$6/unit$

A THOUGHT QUESTION

28. Suppose the government wants to maximize total welfare in this market. Which of the following excise tax rates will the government prefer to implement in this market if this is the government's goal?

- a. \$0 per unit since DWL = \$0 here!
- b. \$3 per unit
- c. \$5 per unit
- d. The government finds that total welfare in this market is the same no matter which of these three excise tax rates they implement in this market.

Use the following information to answer the next **THREE (3)** questions.

Amy earns an income of \$90 and purchases only markers (M) and textbooks (T) with this income. You are provided the following information:

- Price of a Marker = \$3 per marker
- Price of a Textbook = \$6 per textbook
- Marginal Utility of a Marker = $MU_{\text{marker}} = T$
- Marginal Utility of a Textbook = $MU_{\text{textbook}} = 2M$
- Amy's Total Utility = $U = 2MT$

$$BL_1: \begin{cases} 90 = 3M + 6T \\ 30 = M + 2T \end{cases}$$

Optimization Rule:

$$\frac{P_M}{P_T} = \frac{MU_M}{MU_T} \rightarrow \frac{3}{6} = \frac{T}{2M} \rightarrow \begin{cases} 6M = 6T \\ M = T \end{cases}$$

HARD

29. Given this information and holding everything else constant, which of the following statements is true when Amy consumes her optimal consumption bundle?

- a. The marginal utility of markers must be higher than the marginal utility of textbooks. ~~X~~
- b. The marginal utility of textbooks must be higher than the marginal utility of markers. *True*
- c. The marginal utility of textbooks must be equal to the marginal utility of markers. ~~X~~
- d. The relationship between the marginal utility of textbooks and the marginal utility of markers cannot be determined without more information. ~~X~~

#29 proof!

$$\frac{MU_M}{P_M} = \frac{MU_T}{P_T} \quad \left| \quad \begin{cases} 30 = T + 2T \\ 30 = 3T \\ 10 = T \\ 10 = M \end{cases} \right.$$

$$\frac{P_M}{MU_M} = \frac{P_T}{MU_T} \quad \left| \quad \begin{cases} 6MU_M = 3MU_T \\ MU_M = \frac{1}{2}MU_T \\ MU_M < MU_T \end{cases} \right.$$

SOME WORK

30. Suppose the price of textbooks (T) decreases from its original level to \$3 per unit while the price of markers (M) remains at \$3. Given this information and holding everything else constant, what is the optimal consumption bundle (T, M) that Amy will now consume?

- a. (T, M) = (10, 20)
- b. (T, M) = (20, 10)
- c. (T, M) = (25, 5)
- d. (T, M) = (10, 10)

$$BL_2: \begin{cases} 90 = 3M + 3T \\ 30 = M + T \end{cases}$$

$$\frac{P_M}{P_T'} = \frac{MU_M}{MU_T}$$

$$\frac{3}{3} = \frac{T}{2M}$$

$$\begin{cases} 6M = 3T \\ 2M = T \end{cases}$$

$$\begin{cases} 30 = M + 2M \\ 30 = 3M \\ 10 = M \\ 2(10) = T \\ 20 = T \end{cases}$$

$$(T, M) = (20, 10)$$

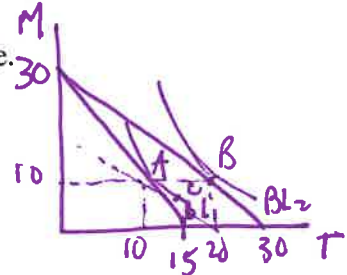
HARD

31. Suppose the price of textbooks (T) decreases from its original level to \$3 per unit while the price of markers (M) remains at \$3. Which of the following statements is true about Amy's demand for textbooks given this price change and holding everything else constant?

- a. Amy's substitution effect is negative while her income effect is positive. *X*
- b. Amy's substitution and income effects cancel each other out exactly: Amy's consumption of the textbooks does not change. *X*
- c. Amy's substitution effect is positive while her income effect is negative. *✓*
- d. Amy's substitution effect and income effect are both positive. *✓*

At pt A: $U_A = 200$
 At pt C: $U_C = 2M_3T_3 = 200$
 $M_3T_3 = 100$
 $2M_3 = T_3$

At C (+) sub-eff
 as P_T ↓, Amy buys
 more markers



NOT BAD

32. Which of the following groups listed below benefit more when a country moves from a closed economy to unregulated open trade?

- a. Domestic Consumers in this country
- b. Domestic Producers in this country
- c. The Government of this country
- d. You cannot determine which group benefits from this change unless you know the world price of the good and the closed market equilibrium price for the good.

$M_3(2M_3) = 100$ C to B: as Income ↑, Amy
 consumes more T ⇒
 (+) inc eff
 $M_3^2 = 50$
 $M_3 = 5\sqrt{2} \approx 7.07$
 $T_3 = 2M_3 \approx 14.14$

Use the following information to answer the next three (3) questions.

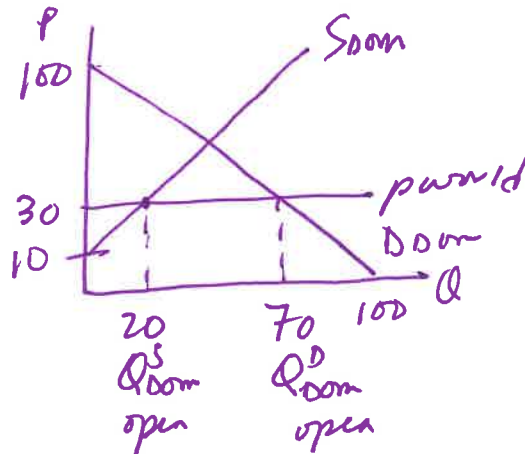
Demand and supply in country X are given by the following equations where Q is the quantity of units of the good and P is the price per unit of the good:

Domestic Demand: $P = 100 - Q$
 Domestic Supply: $P = 10 + Q$
 World price: $P_w = 30$

EASY

33. Suppose that country X opens this market up to unregulated trade. Given this information and holding everything else constant, which of the following statements is true?

- a. Country X will export 50 units
- b. Country X will import 50 units
- c. Country X will export 25 units
- d. Country X will import 25 units



$Q^D > Q^S$ in open
 economy ⇒ will
 import the
 difference

NOT HARD

34. Suppose that country X opens this market to trade while implementing a tariff that raises the price by \$25 per unit of the good. Given this information and holding everything else constant, how many units will be imported when this tariff is implemented?

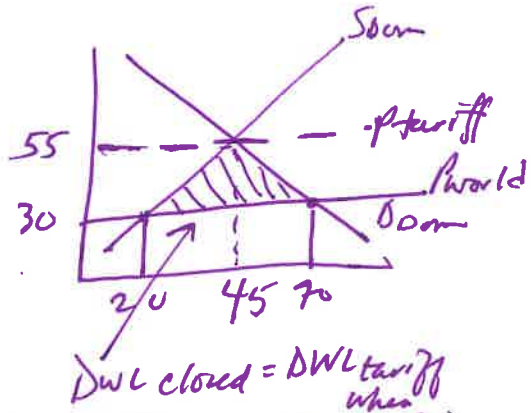
- a. 45 units
- b. 25 units
- c. 20 units
- d. 0 units

if $P = \$55 \Rightarrow Q_{dom}^D = 45$
 $Q_{dom}^S = 20$

$$100 - Q = 10 + Q$$

$$90 = 2Q$$

$$45 = Q$$



NOT HARD

35. Suppose that country X opens this market to trade while implementing a tariff that raises the price by \$25 per unit of the good. Given this information and holding everything else constant, what is the deadweight loss due to the imposition of this tariff?

- a. $(\frac{1}{2})(25)(50)$ dollars ✓
- b. $(\frac{1}{2})(10)(50)$ dollars ✗
- c. $(\frac{1}{2})(25)(25)$ dollars ✗
- d. 0 dollars ✗

$$DWL = \frac{1}{2} (55 - 30) (70 - 20)$$

$$= \frac{1}{2} (25) (50)$$

when tariff is \$25/unit and $P_w = 30/unit$

Use following information to answer next **THREE (3)** questions.

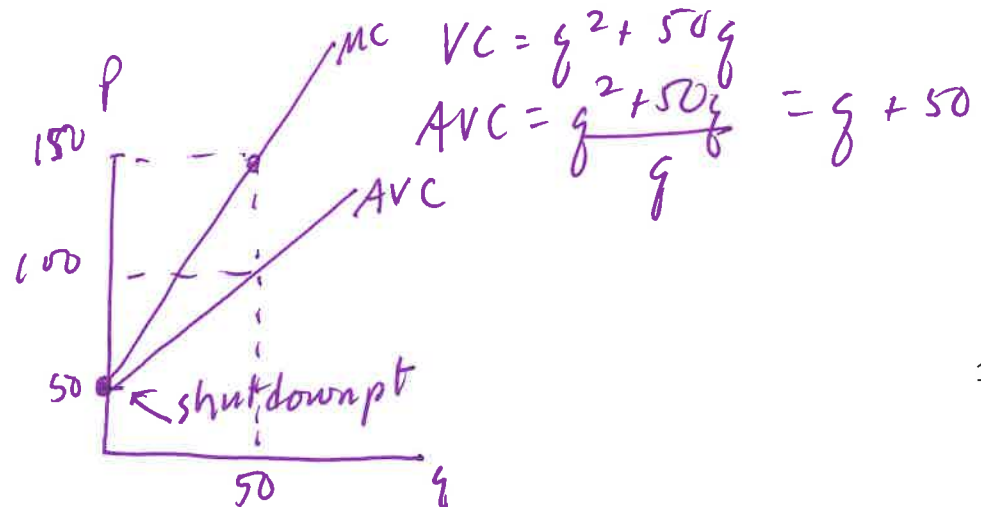
A firm in perfect competition has ^{the} following cost structure where q is the number of units of the good that the firm produces:

Total Cost: $TC = q^2 + 50q + 49$
 Marginal Cost: $MC = 2q + 50$

EASY

36. Given the above information and holding everything else constant, what is this firm's fixed cost (FC) when the firm produces two units of output?

- a. FC = \$24.5
- b. FC = \$54
- c. FC = \$153
- d. FC = \$49



MORE CHALLENGING

37. Given this information and holding everything else constant, what is this firm's shut down price in the short run (P shut-down) and what is this firm's breakeven price in the long run (P break-even)?

- a. P shut-down = \$50 and P break-even = \$64 ✓
- b. P shut-down = \$64 and P break-even = \$50
- c. P shut-down = \$60 and P break-even = \$57
- d. P shut-down = \$7 and P break-even = \$74

$$VC = q^2 + 50q$$

$$AVC = \frac{q^2 + 50q}{q} = q + 50$$

Shut down pt $\Rightarrow MC = AVC$

$$2q + 50 = q + 50$$

$$2q = q$$

$$q = 0$$

OR, Breakeven pt \Rightarrow

$$MC = ATC$$

$$2q + 50 = q + 50 + \frac{4q}{q}$$

$$q^2 = 4q$$

$$q = 7$$

if $q = 0 \Rightarrow P = \$50/\text{unit} \Rightarrow$ can stop here!

if $q = 7 \Rightarrow P = 2(7) + 50 = 64$
 $\$64$ is breakeven price

NOT HARD

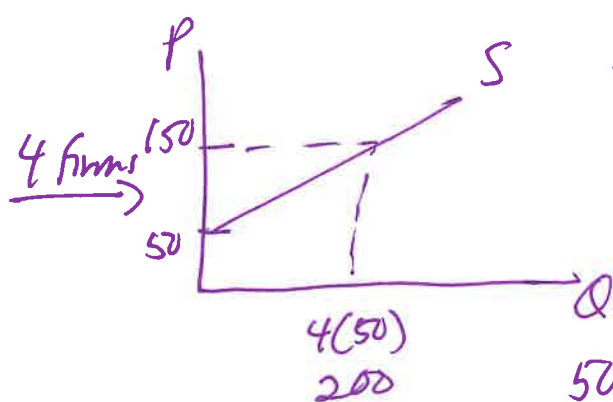
38. Assume there are 4 identical firms in the market. Market demand is given by the following equation where Q is the market quantity and P is the price per unit of the good:

Market Demand: $Q = 80 - P$

$D: P = 80 - Q$

Given this information and holding everything else constant, what is the short-run market equilibrium quantity and price?

- a. ~~Q = 40; P = \$76~~
- b. Q = 20; P = \$60 ✓
- c. ~~Q = 40; P = \$52.5~~
- d. ~~Q = 4; P = \$76~~



$S: P = 50 + \frac{1}{2}Q$

$D: P = 80 - Q$

$$50 + \frac{1}{2}Q = 80 - Q$$

$$\frac{3}{2}Q = 30$$

$$Q = 30 \left(\frac{2}{3}\right) = 20$$

$$P = 50 + \frac{1}{2}(20) = 60$$

or

$$P = 80 - 20 = 60$$

So ME
THOUGHT

39. The table below represents Martin's marginal utilities (MU) for doughnuts and cans of soda. Suppose the price of 1 doughnut and 1 can of soda are the same and that Martin's income is \$6. Given this information and holding everything else constant, how many doughnuts and sodas will Martin consume?

Quantity of doughnuts	MU of an additional doughnut	Quantity of cans of soda	MU of an additional can of soda
1	15	1	18
2	14	2	16
3	11	3	11
4	7	4	4

- a. 1 doughnut and 1 soda
- b. 2 doughnuts and 2 sodas
- c. 3 doughnuts and 3 sodas
- d. 0 doughnuts and 2 sodas

$$\frac{MU_{\text{doughnut}}}{P_{\text{doughnut}}} = \frac{MU_{\text{soda}}}{P_{\text{soda}}}$$

$$P_{\text{doughnut}} = P_{\text{soda}}$$

So $\therefore MU_{\text{doughnut}} = MU_{\text{soda}}$
 Look at table \Rightarrow 3 Doughnuts & 3 sodas

EASY

40. Which of the following statements is true about perfect competition?

- a. The minimum AVC is the price at which the firm breaks even in the long run. ~~X~~
- b. The minimum ATC is the price at which the firm shuts down in the short run. ~~X~~
- c. The AFC intersects MC at the AFC's minimum. ~~X~~
- d. The AFC decreases as the quantity produced increases.

shut down pt. in SR
 breaks even
 the AFC has no minimum

