Economics 102
Fall 2017
First Midterm with Answers
Date: Thursday, October 12, 2017

Name *ANNOTATED KEY*

The exam consists of three parts: (1) 11 Binary Choice Questions worth 2.5 points each (27.5 points total); (2) 20 Multiple Choice Questions worth 3.5 points each (70 points total); (3) Administrative Points worth 2.5 points that are awarded to you for correctly filling out the required information on your scantron and your exam booklet. Please accurately and completely provide your name, student ID number and section number on the provided scantron as well as on the exam booklet. Answer all questions on the scantron sheet with a #2 pencil.

NO CELL PHONES, CALCULATORS, OR FORMULA SHEETS ARE ALLOWED FOR THIS EXAM.

PICK THE BEST ANSWER FOR EACH QUESTION.

Section	Time and Location	TA
340	Fri. 9:55 AM - 10:45 AM, Social Science 5322	Steven Zhang
341	Thurs. 3:30 PM - 4:20 PM, Social Science 5322	Lois Miller
342	Thurs. 2:25 PM - 3:15 PM, Social Science 4314	Lois Miller
343	Fri. 2:25 PM - 3:15 PM, Social Science 6203	Lois Miller
344	Fri. 11:00 AM - 11:50 AM, Van Hise 140	Lois Miller
345	Fri. 12:05 PM - 12:55 PM, Ingraham 116	Yunhan Shin
346	Fri. 8:50 AM - 9:40 AM, Ingraham 214	Yunhan Shin
347	Fri. 1:20 PM - 2:10 PM, Ingraham 222	Yunhan Shin
348	Fri. 2:25 PM - 3:15 PM, Social Science 6102	Yunhan Shin
350	Fri. 11:00 AM - 11:50 AM, Van Hise 595	Steven Zhang

Worksheet
DO NOT REMOVE FROM EXAM BOOKLET!!

VERSION 1

I, _____, agree to neither give nor receive any help on this exam from other students. Furthermore, I understand that use of a calculator on this exam is an academic misconduct violation. I also understand that failure to cover my answers is academic misconduct: it is important that I maintain the integrity of my work and that I do not make it available to other students.
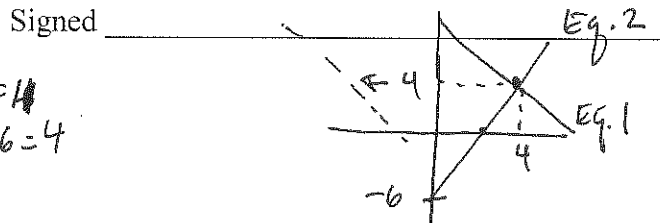
Signed _____

(handwritten work):
$20 - 4X = 2.5X - 6$
$26 = \frac{65}{10}X$
$\frac{260}{65} = X$
$4 = X$
$Y = 20 - 4(4) = 4$
$Y = 2.5(4) - 6 = 4$

Part I. Binary Choice Questions (11 questions each worth 2.5 points = 27.5 points)

(handwritten note in margin): NOT HARD YOU DON'T REALLY NEED ANY MATH!
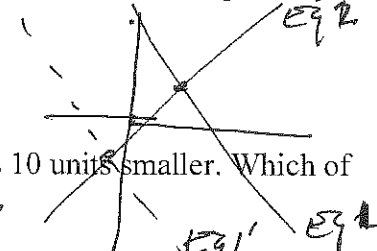
1. You are given the following two equations:
   Eq. 1: $Y = 20 - 4X$
   Eq. 2: $Y = 2.5X - 6$
   Suppose Eq. 1 shifts such that for every Y value, the new X value is 10 units smaller. Which of the following statements is true?
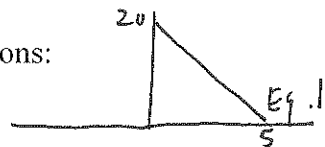
   (a.) The y-value of the intersection of the new Eq. 1 with the original Eq. 2 is *less than* the y-value for the intersection of the original two lines.

   b. The y-value of the intersection of the new Eq. 1 with the original Eq. 2 is *more than* the y-value for the intersection of the original two lines.

(handwritten note in margin): EASY

2. You are given the following equation:
   $Y = 10 - 3X$
   Suppose the equation shifts such that for every X value, the new Y value is 2 units larger. Given this information, what is the equation of the new line?

   a. $Y = 4 - 3X$
   (b.) $Y = 12 - 3X$

*(handwritten): Y=12-3X, Y=10-3X*
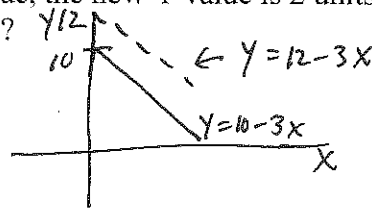
(handwritten note in margin): EASY

3. Which of the following questions is an example of *normative* economics?

   a. How much additional revenue will be generated from increasing a tariff on bananas from $0.10 per 100 bananas to $0.20 per 100 bananas? *Positive*

   (b.) Should the government increase the tariff on bananas, considering the revenue that will be raised and the people who will be affected by the tariff increase? *Normative*

4. The production possibility frontier of Friesberg, which produces only ships and tables, is shown below:

PPF of Friesberg
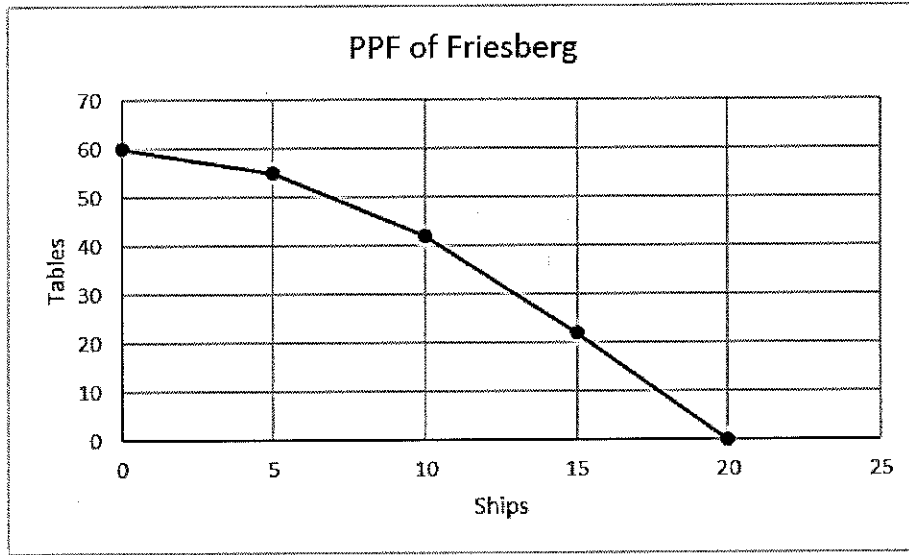
As Friesberg produces more ships, the opportunity cost of producing 1 ship in terms of tables is:

a. decreasing
(b) increasing

DEFINITION 5. _____ is a branch of economics that studies the behavior of individuals and firms and how these entities make decisions regarding the allocation of scarce resources. _____ also considers the interactions among these individuals and firms.

(a.) Microeconomics
b. Macroeconomics

DEFINITION 6. _____ is the study of the behavior of the aggregate economies or economic systems instead of the behavior of individuals, individual firms, or markets. It is concerned primarily with gross national product, the level of unemployment, and inflation.

a. Microeconomics
(b) Macroeconomics

EASY:
DEFINITION 7. When a third-year Ph.D. student claims that he has climbed Bascom Hill 637 times, is he talking about a flow measure or a stock measure?

a. Flow measure
(b.) Stock measure   Measure data point in time

Initial profit = 50,000 - 30,000 = 20,000

Rev ↑ 20% ⇒ Rev = 60,000 } New profit = 21,000
Cost ↑ 30% ⇒ Cost = 39,000

$20 \Delta \text{ in } \Pi = \left[\dfrac{21,000 - 20,000}{20,000}\right](100\%)$

SOME WORK:

NOT HARD

8. The profit for a firm is given by:
   Profit = Revenue – Cost
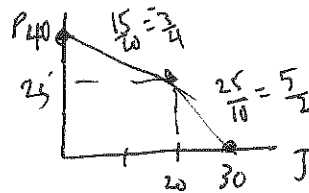
The monthly revenue for Badger's Dairy Farm is $50,000 and the monthly cost is $30,000. Suppose the monthly revenue for Badger's Dairy Farm increases by 20% and, at the same time, the monthly cost for Badger's Dairy Farm increases by 30%. Given this information and holding everything else constant, what will happen to the monthly profit of Badger's Dairy Farm?

$\% \Delta \text{ in } \Pi = \dfrac{1,000}{20,000}(100\%) = 5\% \uparrow$

(a.) The monthly profit increases by 5%.
 b. The monthly profit decreases by 10%.

9. Suppose that ZARA, a Spanish clothing manufacturer, produces only two products: jackets (J) and pants (P). ZARA has three production alternatives: (J, P) = (30,0), (20, 25), and (40, 0). In this case, ZARA is faced with _____.

$\dfrac{15}{20} = \dfrac{3}{4}$ $\dfrac{25}{10} = \dfrac{5}{2}$

This is (0, 40) ⇒ announcement made!

 a.   constant opportunity cost
(b.)   increasing opportunity cost

NOT HARD

10. The economy consists of two people: Kumail and Emily. The following equations give Kumail's and Emily's individual demand curves for stuffed pizza where Q is the quantity of stuffed pizza and P is the price per stuffed pizza:
   Kumail's demand curve for stuffed pizza: P = 2 - Q
   Emily's demand curve for stuffed pizza is P = 2 - 2Q
Given this information and holding everything else constant, what is the economy-wide demand function for stuffed pizza?

Kumail   Emily   Market

$P = 2 - \dfrac{2}{3}Q$
$\dfrac{2}{3}Q = 2 - P$
$Q = \dfrac{3}{2}(2 - P)$

 a. 2P = 4 - 3Q
(b.) Q = 3 - (3/2) P ✓

EASY
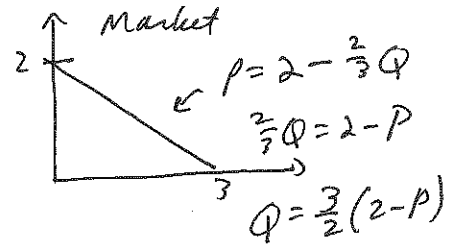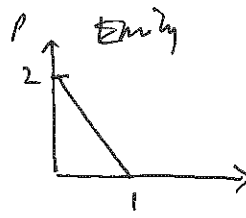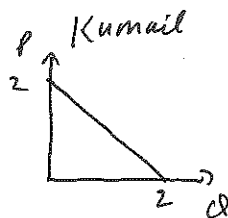
11. Consider the statement:
   "In 2016, China produced more motor vehicles than any other country in the world which implies that China has the comparative advantage in producing motor vehicles."
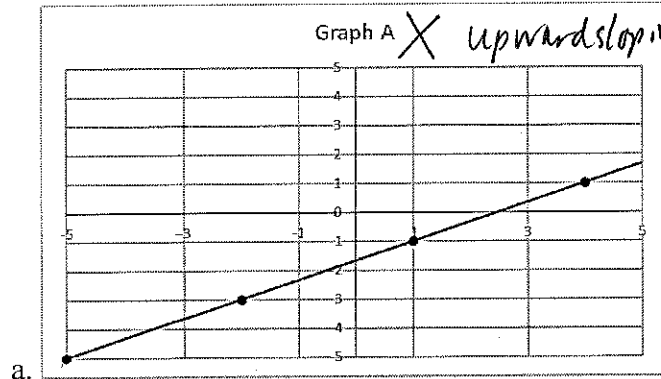Is this statement true or false?

They have absolute advantage but not necessarily comparative advantage

$Q = 3 - \dfrac{3}{2}P$

 a. True
(b.) False

12. Pick the graph that corresponds with the following information: for every 2 unit increase in in the y variable, the x variable decreases by 3 units.
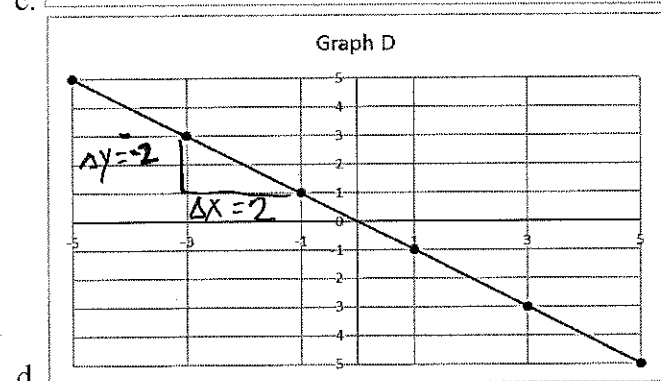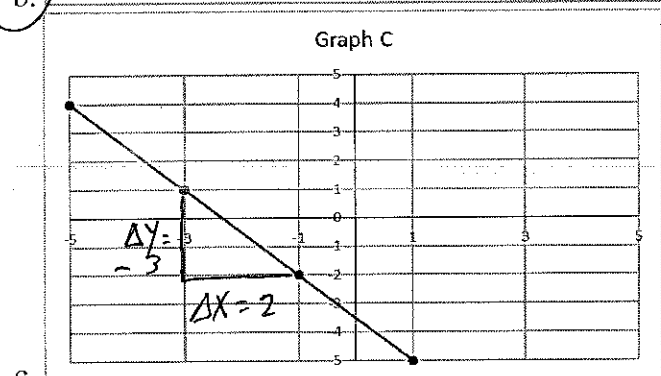
JUST READING THE GRAPHS

Graph A ✗ upward sloping

a.

Graph B

$\Delta Y = -2$ $\Delta X = 3$

b. ⃝

Graph C

$\Delta Y = -3$ $\Delta X = 2$

c.

Graph D

$\Delta Y = -2$ $\Delta X = 2$
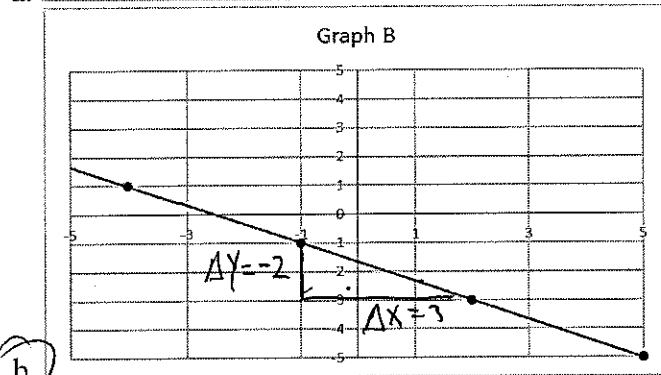
d.

as $Y \uparrow$ by 2, $X \downarrow$ by 3

$$\frac{\Delta Y}{\Delta X} = \frac{2}{-3}$$

must be downward sloping

13. Jiro's sushi place makes two types of sashimi: Tuna (T) and Salmon (S). He knows that for every extra Tuna (T) sashimi he makes he must give up making (1/3) Salmon (S) sashimi. He is currently making 7 Tuna (T) sashimi and 9 Salmon (S) sashimi. Given this information and holding everything else constant, which of the following expressions is Jiro's ~~productivity~~ possibility frontier?

production

a. S = - (1/3) T +34/3
b. S = - (1/3) T +31/3
c. S = - 3T +34/3
d. S = - 3 T +31/3
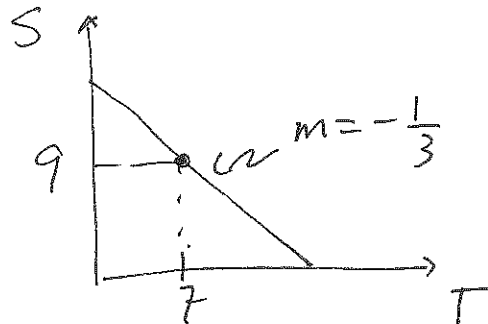
$$OC \, 1T \, \text{is} \, \tfrac{1}{3} S$$

$$Y = mX + b$$

$$S = -\tfrac{1}{3}T + b$$

$$(T, S) = (7, 9) \quad \text{known point}$$

$$9 = -\tfrac{1}{3}(7) + b$$

$$\tfrac{27}{3} + \tfrac{7}{3} = b$$

$$\tfrac{34}{3} = b$$

$$S = \tfrac{34}{3} - \tfrac{1}{3}T$$

Use the following information to answer the next <u>FOUR</u> (4) questions.

Wisconsin and Minnesota are two economies each producing two goods: cheese (C) and waffles (W). Currently the two economies do not trade with one another. Assume that both economies have linear production possibility frontier (PPF) and that they can produce any combination of C and W that lie on these linear PPFs. The tables below provide the information about each state's production possibilities frontier.

	Wisconsin's Production Alternatives		
Products	A	B	C
Units of Cheese	0	40	80
Units of Waffles	40	20	0

	Minnesota's Production Alternatives		
Products	D	E	F
Units of Cheese	0	30	60
Units of Waffles	90	45	0

See below

PREDICTABLE 14. Wisconsin's opportunity cost for producing an additional unit of waffles is $2C$ ___ while Minnesota's opportunity cost for producing an additional unit of cheese is $\frac{3}{2} W$. Given the information in the tables, Wisconsin should specialize in producing *Cheese* while Minnesota should specialize in producing *Waffles*

a. 0.5 unit of cheese; 2 units of waffle; cheese; waffles
b. 0.5 unit of cheese; 2 units of waffle; waffles; cheese
c. 2 units of cheese; 1.5 units of waffle; cheese; waffles
d. 2 units of cheese; 1.5 units of waffle; waffles; cheese

SOME
WORK ⁺ 15. Suppose the economy of Wisconsin tries to produce 20 units of cheese and 30 units of
REASONING waffles and the economy of Minnesota tries to produce 40 units of cheese and 40 units of waffles. Given this information, which of the following statements is true?

a. The production plan of Wisconsin is not efficient, but feasible. X
b. The production plan of Minnesota is efficient. X *Not feasible*
c. The production plan of Wisconsin is not feasible. X
d. The production plan of Minnesota is not feasible. ✓

14.

WISC.

W↑
40
20

PPF_W

40   80 (C)

$OC \cap IC \ is \ \frac{1}{2}W$
$OC \cap IW \ is \ 2C$

MINN

(W)↑
90   ←3/2

PPF_M

60   C

$OC \cap IC \ is \ \frac{3}{2}W$
$OC \cap IW \ is \ \frac{2}{3}C$

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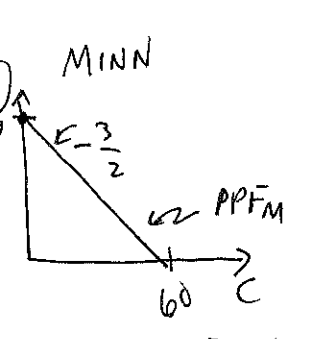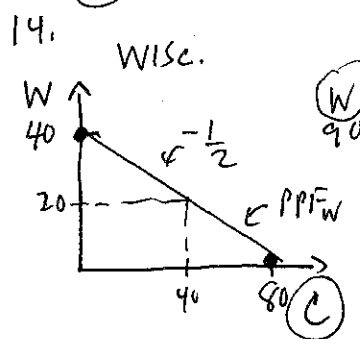
15. WISC PPF: $W = 40 - \frac{1}{2}C$
    So if $C = 20$ ⟹
       $W = 40 - \frac{1}{2}(20) = 30$
    $(C, W) = (20, 30)$ *feasible!*
                          efficient
    eliminates (a) & (c)

MINN PPF: $W = 90 - \frac{3}{2}C$
    So if $C = 40$ ⟹
       $W = 90 - \frac{3}{2}(40) = 30$
    $(C, W) = (40, 40)$ *not feasible!*

16. For this question, construct Wisconsin and Minnesota's joint PPF. Please measure cheese (C) on the horizontal axis and waffles (W) on the vertical axis. Which of the following expressions and the corresponding ranges for each segment of the joint PPF are correct?
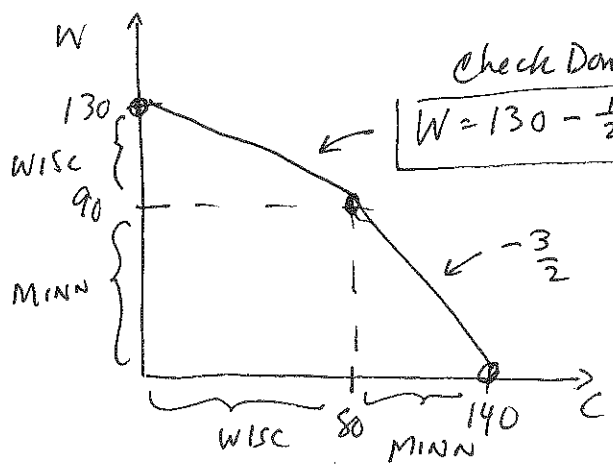
    a. $W = 130 - \frac{3}{2}C$ for $0 \le C \le 80$

    b. $W = 210 - \frac{3}{2}C$ for $80 \le C \le 140$ ✓

    c. $W = 210 - \frac{1}{2}C$ for $0 \le C \le 80$

    d. $W = 130 - \frac{3}{2}C$ for $80 \le C \le 140$

17. Suppose that 20 units of cheese are traded. Which of the following represents a range of trading prices in terms of waffles that would be acceptable to both Wisconsin and Minnesota? The acceptable range of trading prices for 20 units of cheese would be

    a. between 5 and 30 units of waffle. X 5 is too low

    b. between 10 and 15 units of waffle. ✓

    c. between 5 and 15 units of waffle. X 5 is too low
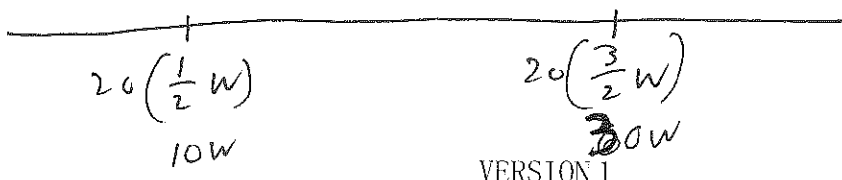
    d. between 10 and 30 units of waffle. ✓

16. Joint PPF

check Domains first! All are reasonable

$W = 130 - \frac{1}{2}C$ for $0 \le C \le 80$

$y = mx + b$

$W = \left(-\frac{3}{2}\right)C + b$

known points: $(C, W) = (80, 90)$ and $(140, 0)$

$0 = \left(-\frac{3}{2}\right)(140) + b$

$210 = b$

$W = 210 - \frac{3}{2}Q$ for $80 \le C \le 140$

17. $20 (1C)$

$20\left(\frac{1}{2}W\right)$ $20\left(\frac{3}{2}W\right)$

$10W$ $30W$

Use the following information to answer the next <u>FIVE</u> (5) questions.

Smallworld is a small economy. Its market for beef is characterized by the following demand and supply equations where Q is the quantity of units of beef and P is the price per unit of beef:

Smallworld's Demand for Beef: $Q^D = 100 - 2P$

Smallworld's Supply of Beef: $Q^S = P - 20$

The world price for beef is $P^W = \$30$ per unit of beef.

NOT HARD 18. Suppose Smallworld opens is beef market to international. (trade.) In equilibrium, what is the level of consumer surplus (CS) and producer surplus (PS) in the market for beef in Smallworld?

    a. CS = $400, PS = $100 ✓ ✗

    (b.) CS = $400, PS = $50 ✓

    c. CS = $200, PS = $100 ✗

    d. CS = $200, PS = $50 ✗

NOT HARD 19. Suppose Smallworld now closes its border and withdraws from trading in the world beef market. What is the new consumer surplus (CS') and producer surplus (PS') in Smallworld's market for beef?

    a. CS' = $200, PS' = $100 ✗

    b. CS' = $200, PS' = $50 ✗

    c. CS' = $100, PS' = $100 ✗

    (d.) CS' = $100, PS' = $200 ✓

NOT HARD 20. What is the Smartworld's deadweight loss (DWL) due to its withdrawal from the world beef market?

    a. $0

    b. $100

    (c.) $150

    d. $200

19. $CS_{closed} = \frac{1}{2}(50-40)(20)$
$= (10)(10) = \$100$
$\Rightarrow$ eliminates (a) & (b)

$PS_{closed} = \frac{1}{2}(40-20)(20)$
$= 20(10) = \$200$
$\Rightarrow$ eliminates (c)

18. $Q^D = 100 - 2P$ $Q^S = P - 20$
$2P = 100 - Q^D$ $P = Q^S + 20$
$P = 50 - \frac{1}{2}Q^D$

$50 - \frac{1}{2}Q = Q + 20$
$100 - Q = 2Q + 40$
$60 = 3Q$
$20 = Q$

20. $TS_{open} = \$450$
$TS_{closed} = \$300$
$\therefore DWL_{closed} = \$150$

$CS_{open} = \frac{1}{2}(50-30)(40)$
$= 20(20) = \$400 \Rightarrow$ eliminates (c) & (d)

$PS_{open} = \frac{1}{2}(30-20)(10)$
$= 5(10) = \$50 \Rightarrow$ eliminates (a)

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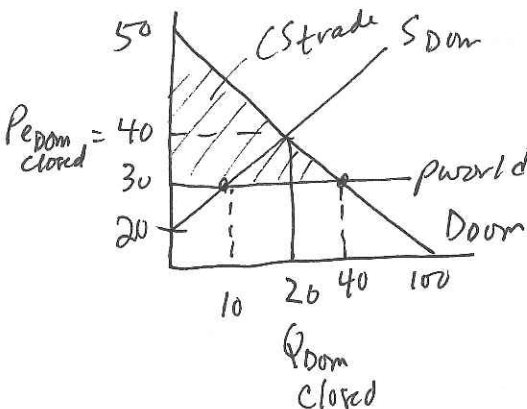
21. When Smallworld withdraws from the world beef market, economists in Smallworld argue that trade is beneficial and that Smallworld should re-enter the international market for beef. Which of the following statements is true?

a) Smallworld consumers are better off when Smallworld opens up its market for beef. T
b. Smallworld producers are better off when Smallworld opens up its market for beef. F
c. Both Smallworld consumers and Smallworld producers are better off when Smallworld opens up its market for beef. F
d. None of the above statements is true. F

22. Suppose Smallworld re-opens its market for beef but, at the same time, introduces a per-unit tariff of $5 for each unit of beef imported. What is the deadweight loss (DWL) due to the imposition of this tariff?

a. $0
b. $12.50
c) $37.50
d. $112.50
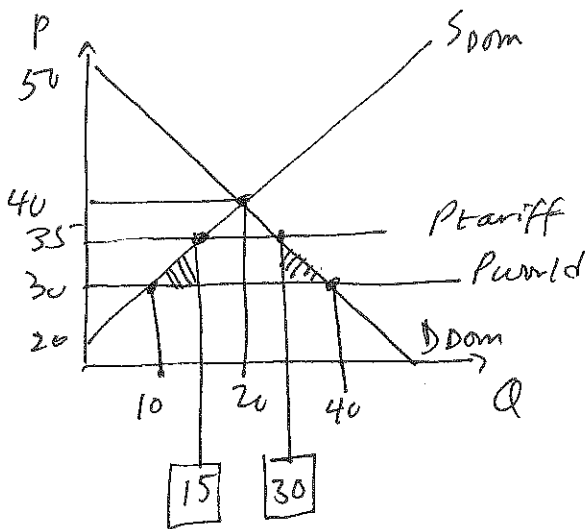
if $P = 35$

$S: Q^S = 35 - 20 = 15$
$D: Q^D = 100 - 2(35) = 30$

$DWL = \frac{1}{2}(35-30)(15-10) + \frac{1}{2}(35-30)(40-30)$

$= \frac{1}{2}(5)(5) + \frac{1}{2}(5)(10)$

$= 12.50 + 25$

$= \$37.50$

Use the following information to answer the next <u>THREE</u> (3) questions.

In Tomorrowland, a very small <u>closed</u> economy, the supply and demand for Macroeconomics textbooks are given by the following demand and supply equations where Q is the number of textbooks and P is the price per textbook measured in dollars:

$5Q^D = 200 - P$

Domestic demand in Tomorrowland: $P = 200 - 5Q$ ⟶ $\quad Q^D = 40 - \frac{1}{5}P$

Domestic supply in Tomorrowland: $P = 40 + 3Q$ ⟶ $3Q^S = P - 40$

The world price of a Macroeconomics textbook is $70. $\qquad Q^S = \frac{1}{3}P - \frac{40}{3}$

SomE woRK 23. When Tomorrowland's economy is closed, the equilibrium price of a Macroeconomics textbook is_____ and the equilibrium quantity of Macroeconomics textbooks is_____. If Tomorrowland opens this market to trade, the total quantity of imports would be __16__.

    a. $20; 100 textbooks; 26 textbooks ✗
    (b.) $100; 20 textbooks; 16 textbooks ✓
    c. $20; 100 textbooks; 16 textbooks
    d. $100; 20 textbooks; 10 textbooks ✗

SomEwoRK 24. Suppose the government of Tomorrowland decides to open up its Macroeconomics textbook market to trade. Domestic Macroeconomics textbook producers, upset by this new trade policy, lobby President Marco to protect their industry by issuing a number of licenses, each giving the license holder the right to import a limited quantity of Macroeconomics textbooks. Specifically, this import quota limits the total quantity of imports to 8 Macroeconomic textbooks. This import quota policy will raise the domestic price of a Macroeconomics textbook to _____.

    a. $75
    b. $80
    (c.) $85
    d. $90

24. $Q^S + 8 = Q^D$ w/ import quota

$15\left[\frac{1}{3}P - \frac{40}{3} + 8 = 40 - \frac{1}{5}P\right]$

$5P - 200 + 8(15) = 40(15) - 3P$

$8P = 40(15) - 8(15) + 200$

SomE woRK 25. Given the import quota described in the last question, the license holder revenue is __$120__ and the deadweight loss from the imposition of this import quota is _____.
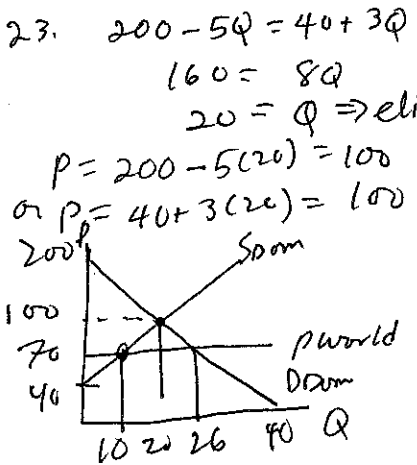
    a. $60; $120 ✗
    (b.) $120; $60 ✓
    c. $60; $30 ✗
    d. $120; $30 ✗

$8P = \dfrac{40(15) - 8(15) + 200}{8}$

$P = 5(15) - 15 + 25$

$P = 75 - 15 + 25$

$P = 60 + 25 = \$85$

23. $200 - 5Q = 40 + 3Q$
    $160 = 8Q$
    $20 = Q$ ⟹ eliminates (a) & (c)

$P = 200 - 5(20) = 100$
or $P = 40 + 3(20) = 100$

if $P = 70$ ⟹
D: $70 = 200 - 5Q^D$
    $5Q^D = 130$
    $Q^D = 26$
    VERSION 1
S: $70 = 40 + 3Q^S$
    $30 = 3Q^S$
    $10 = Q^S$

$26 - 10 = $ Imports
$16 = $ Imports
eliminates (d)
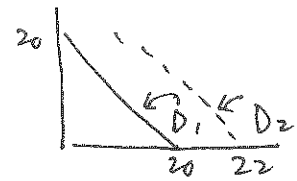
25. License Holder Revenue =
~~#8(import)~~
$(85 - 70)(8\text{ import}) =$
$(15)(8) = \$120$
eliminates (a) & (c)

[cont next page]

(top right graph)

20

D_1 D_2

20 22

Use the following information to answer the next __TWO__ (2) questions.

The market for the Nintendo Switch is characterized by the following demand and supply equations where Q is the quantity of Nintendo Switches and P is the price per Nintendo Switch:

Demand Curve for Nintendo Switches: $Q^D = 20 - P$ $D': Q^D = 22 - P$

Supply Curve for Nintendo Switches: $Q^S = P - 10$

The market for Nintendo Switches is currently in equilibrium.

Initially
$20 - P = P - 10$
$30 = 2P$
$15 = P$

SOMEWORK *NOT HARD* 26. After a successful marketing campaign, people now demand 2 more Nintendo Switches at every price level. Which of the following is true about the new market equilibrium?

a. The new equilibrium quantity of Nintendo switches is 2 units greater than the initial equilibrium quantity. ✗

(b) The new equilibrium quantity of Nintendo switches is 1 unit greater than the initial equilibrium quantity. ✓

c. The new equilibrium price for a Nintendo switch is 2 dollars greater than the initial equilibrium price. ✗

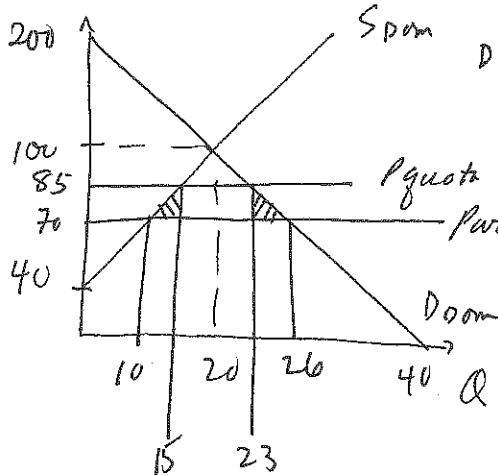d. The new equilibrium price for a Nintendo switch is 2 dollars smaller than the initial equilibrium price. ✗
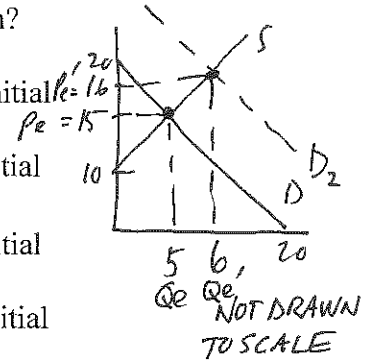
(right side notes near Q26)
$P_e = 16$
$P_e = 15$
20
10
5 $6,$ 20
Qe Qe
NOT DRAWN TO SCALE

new eq.
$22 - P = P - 10$
$32 = 2P$
$16 = P$
eliminates (c) +
(d)
if $P = 16$
$\Rightarrow Q = 6$
eliminates (a)

CASE OF INDETER-MINANCY: PREDICTABLE 27. Suppose that the marketing campaign is accompanied by a major production expansion by Nintendo so that at every price level more Nintendo Switches are produced. Which of the following is true about the new equilibrium price?

a. Compared to the initial equilibrium price, the new equilibrium price for a Nintendo switch is higher.

b. Compared to the initial equilibrium price, the new equilibrium price for a Nintendo switch is lower.

c. The new equilibrium price for a Nintendo switch is the same as the initial equilibrium price.

(d) All of the above answers are possible.

(bottom right graph)
20
16
15
S S_2 S_2
S_2
D_2
D_1
5 6

(bottom handwritten work)
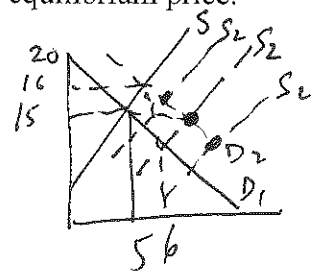
if $P = 85$: $D \Rightarrow Q^D = 40 - \frac{1}{5}(85)$
$Q^D = 40 - 17 = 23$
$S \Rightarrow Q^S = \frac{1}{3}(85) - \frac{40}{3}$
$Q^S = \frac{45}{3} = 15$

25.

P

200

S_{Dom}

100
85
70
40

P_{quota}
P_{world}

D_{Dom}

10 20 26 40 Q

15 23

$DWL = \frac{1}{2}(85 - 70)(15 - 10) + \frac{1}{2}(85 - 70)(26 - 23)$
$= \frac{1}{2}(15)(5) + \frac{1}{2}(15)(3)$
$= \frac{75}{2} + \frac{45}{2}$
$= \frac{120}{2} = \$60$

eliminates (d)

VERSION 1

Use the following information to answer the next __TWO__ (2) questions.

Suppose in the closed economy of Greensville, the market for croissants is characterized by the following equations, where Q is the quantity of croissants in thousands and P is the price per croissant (in dollars).

Demand Curve for Croissants: $Q^D = 18 - 4P$
Supply Curve for Croissants: $Q^S = 2P - 6$

NOT HARD 28. Suppose the current price of croissants in Greensville is \$3/croissant. Given this information and holding everything else constant, which of the following statements is true?

a. There is a surplus of croissants in Greensville. X
b. The market for croissants in Greensville is in equilibrium. X
c. There are likely to be long lines to buy croissants in Greensville.
d. Consumer behavior is likely to drive the price of croissants in Greensville down. ✓ up X

EASY 29. Suppose instead that the current price of croissants in Greensville is \$4/croissant. Now, suppose the price of muffins (a substitute for croissants) in Greensville rises from \$3/muffin to \$4/muffin. Holding everything else constant, how will the quantity and price of croissants in Greensville change?

a. Both the quantity and price of croissants will increase. ✓
b. Both the quantity and price of croissants will decrease. X
c. The quantity of croissants will increase but the price of croissants will decrease. X
d. The quantity of croissants will decrease but the price of croissants will increase. X
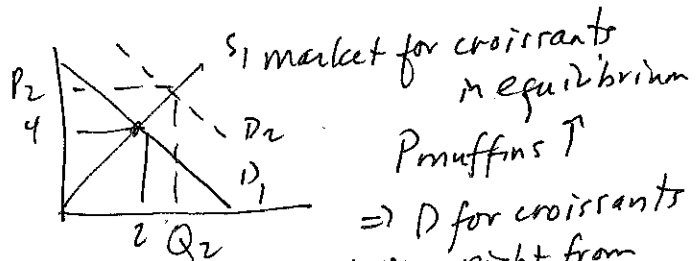
28. Closed economy
P = \$3
$Q^D = 18 - 4(3) = 18 - 12 = 6$ } Excess Demand: Shortage
$Q^S = 2(3) - 6 = 0$ eliminates (a), (b), (d)

29. P = \$4
$Q^D = 18 - 4(4) = 18 - 16 = 2$
$Q^S = 2(4) - 6 = 2$

S1 market for croissants
in equilibrium
Pmuffins ↑
⟹ P for croissants
shifts right from
D1 to D2
∴ P↑ from \$4 ✓
Q↑ from 2 croissants

Use the following information to answer the next TWO (2) questions.

Greenland produces chairs. There are nine firms in all in Greenland that produce these chairs: six of these firms are identical and have supply curves given by the following equation where P is the price per chair and Q is the quantity of chairs:

Individual Supply Curves for a representative firm in this first group of firms: $P = 10 + 2Q$

There are an additional three firms that also produce chairs: these three firms have identical supply curves that are given by the following equation:

Individual Supply Curves for a representative firm in the second group of firms: $P = 60 + Q$

30. If the price of a chair is $60, how many chairs will be produced in all?

    a. 12 chairs
    b. 100 chairs
    c. 125 chairs
    d. 150 chairs ✓

In first group ⇒ one firm ⇒ $P = 10 + 2Q$

In second group ⇒ one firm ⇒
$P = 60 + Q$
$60 = 60 + Q$
$0 = Q$ for one firm

if $P = 60$
$60 = 10 + 2Q$
$50 = 2Q$
$25 = Q$ for one firm
$6(25) = 150$ chairs for 6 firms

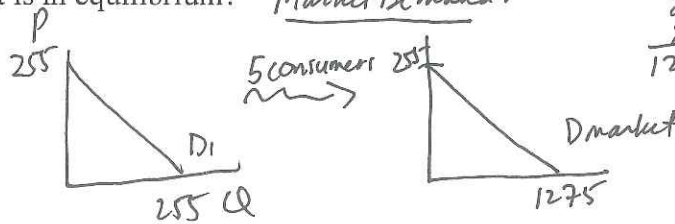**THIS IS A HARD PROBLEM! CONGRATS IF YOU GET IT**

31. In this same market for chairs there are five consumers with identical demand curves where each individual's demand curve is given by the following equation:

    Individual consumer demand curve: $P = 255 - Q$

    Given this information and holding everything else constant, how many chairs does each consumer buy when this market is in equilibrium?
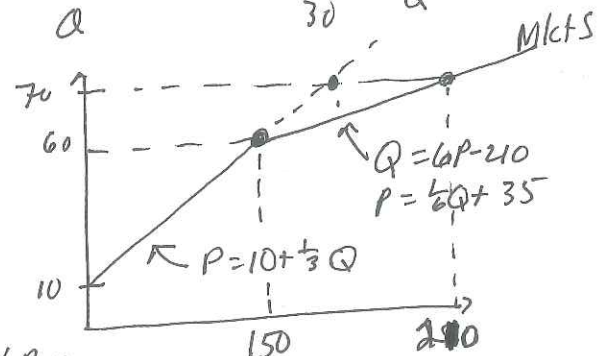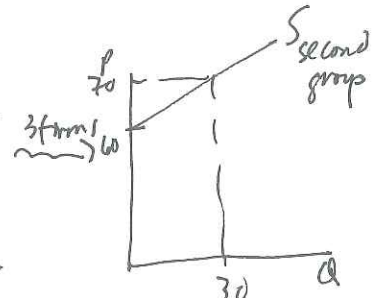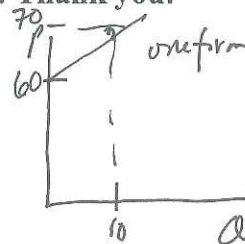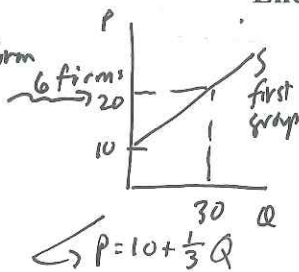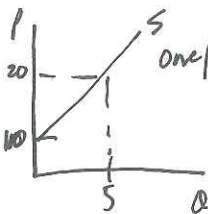
    a. 600 chairs
    b. 120 chairs ✓
    c. 100 chairs
    d. 60 chairs

$Q = 255 - P$
$Q_{TOTAL} = 5(255 - P)$
$Q = 1275 - 5P$
$5P = 1275 - Q$
mkt D: $P = 255 - \frac{1}{5}Q$

Market Demand:
255
$\times 5$
1275

End of Exam! Thank you!

$\hookrightarrow P = 10 + \frac{1}{3}Q$

$P = 10 + 2Q$
$2Q = P - 10$
$Q = \frac{1}{2}P - 5$
$Q_{TOTAL} = 3P - 30$

if $P = 70$
First group:
$Q = 3(70) - 30$
$Q = 210 - 30 = 180$

second group
VERSION 1
$P = 60 + \frac{1}{3}Q$
$Q_2 = 3P - 180$
$Q_1 + Q_2 = Q_{TOTAL} = 6P - 210$

$Q = 6P - 210$
$P = \frac{1}{6}Q + 35$

$P = 10 + \frac{1}{3}Q$

Work Space:

Work Space:

Alternatively:

Mkt Supply = Mkt Demand

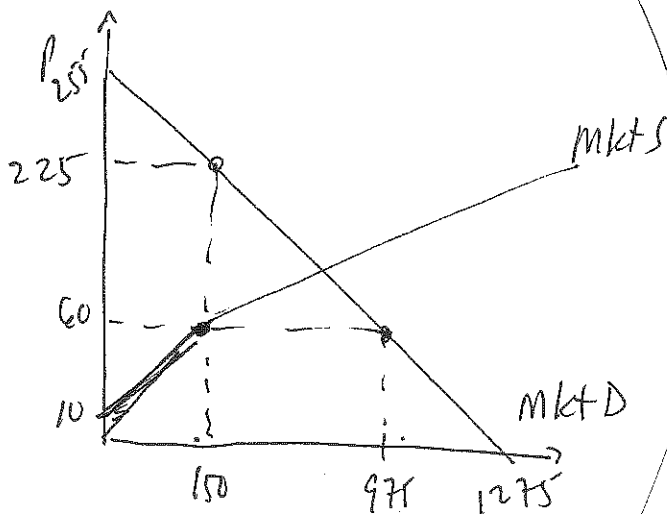$$\frac{1}{6}Q + 35 = 255 - \frac{1}{5}Q$$

$$\frac{5}{30}Q + 35 = 255 - \frac{6}{30}Q$$

$$\frac{11}{30}Q = 220$$

$$Q = \frac{220(30)}{11} = \text{total \# of chairs at equilibrium}$$

$$Q = 20(30) = 600$$

5 consumers: $\frac{Q}{5} = \frac{600}{5} = \boxed{120 \text{ chairs/consumer}}$

Mkt D: if P = 60 ⟹

$Q = 1275 - 5P$
$Q = 1275 - 5(60)$
$Q = 1275 - 300$
$Q = 975$

if Q = 150 ⟹
$P = 255 - \frac{1}{5}(150)$
$P = 255 - 30$
$P = 225$

⎫ So need
⎬ Mkt Supply:
⎭ $P = \frac{1}{6}Q + 35$

Mkt S

Mkt D

P 255
225
60
10
150   975   1275

Mkt Supply: Q = 6P - 210
Mkt Demand: Q = 1275 - 5P

$6P - 210 = 1275 - 5P$
$11P = 1485$
$P = \frac{1485}{11} = \$135$

if consumer pays $135 ⟹
$P = 255 - Q$
$135 = 255 - Q$
$\boxed{Q = 120 \text{ chairs per consumer}}$

Mkt Supply:
mkt demand:

$$11 \overline{)1485} \quad \begin{array}{r} 135 \\ \hline 1485 \\ 1 \\ \hline 38 \\ 33 \\ \hline 55 \end{array}$$

Work Space: