

Economics 101	Name <u>ANNOTATED KEY</u>
Spring 2015	TA Name _____
February 25, 2015	Discussion Section Number _____
First Midterm Morning Lecture	Student ID Number _____

Version 1

**READ THESE INSTRUCTIONS CAREFULLY.
DO NOT BEGIN WORKING UNTIL THE PROCTOR TELLS YOU TO DO SO**

You have 75 minutes to complete this exam including the "**bubbling in of your scantron**". The exam consists of 14 binary response questions worth 2 points each and 20 multiple choice questions worth 3.5 points each for a total of 98 points. You will receive two points if you accurately and completely provide your name, ID number, discussion section number, version number, and TA name on the scantron sheet AND this exam booklet. Thus, the total number of points on the exam is 100. Answer all questions on the scantron sheet with a #2 pencil. There are 20 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 EXAM OR IN THE EXAM ROOM. PLAGIARISM IS A SERIOUS ACADEMIC MISCONDUCT AND PUNISHABLE TO THE FULLEST EXTENT.

PICK ONLY ONE BEST ANSWER FOR EACH QUESTION.

How to fill in the scantron sheet and other information:

- Print your **last name, first name, and middle initial** in the spaces marked "Last Name," "First Name," and "MI." Fill in the corresponding bubbles below.
 - Print your **student ID number** in the space marked "Identification Number." Fill in the bubbles.
 - Write **the number of the discussion section you've been attending under "Special Codes" spaces ABC**, and fill in the bubbles. You can find the discussion numbers below on this page.
 - Write the **version number** of your exam booklet under "Special Codes" space D, and fill in the bubble. The version number is on the top of this page.
- If you believe 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 proctors.**

Discussion Sections (Sorted by Time):

Section	Time	Location	TA
325	Th 3:30PM - 4:20PM	BASCOM 55	Andrea
324	Th 4:35PM - 5:25PM	SOC SCI 6112	Andrea
329	Fr 8:50AM - 9:40AM	INGRAHAM 214	Yoshi
322	Fr 9:55AM - 10:45AM	SOC SCI 6203	Yoshi
330	Fr 9:55AM - 10:45AM	VAN VLECK B131	Tom
320	Fr 11:00AM - 11:50AM	VAN HISE 487	Yoshi
331	Fr 11:00AM - 11:50AM	VAN HISE 375	Tom
327	Fr 12:05PM - 12:55PM	INGRAHAM 214	Tom
328	Fr 12:05PM - 12:55PM	INGRAHAM 224	Gary
323	Fr 1:20PM - 2:10PM	VAN HISE 486	Gary
326	Fr 2:25PM - 3:15PM	SOC SCI 6101	Gary

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EXAM CONTINUES ON NEXT PAGE

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 cover my answers and 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 (14 QUESTIONS WORTH 2 POINTS EACH)

EASY

1. Which of the following is a normative statement?
- a. If UW-Madison raises tuition, more students will choose to attend the university. *testable ⇒ positive*
 - b. UW-Madison should raise tuition in order to increase revenues and improve the university. *↳ an opinion*

READING/
PERCENTAGE
QUESTION

2. In 2014, Andrea's monthly earnings were \$200 and his taxes were \$40. In 2015, his monthly earnings increased by \$200 and the taxes he paid increased by 20% from 2014. Given this information what is the tax rate that Andrea is paying in 2015? Assume that tax rate is defined as the amount of taxes paid divided by income earned expressed as a percentage.

- a. 12%
- b. 24%

	Earnings	Taxes	
2014	200	40	
2015	400	48	↑ 20%

$\frac{40}{200} = .2$
 $\frac{48}{400} = .12$

$$\text{tax rate} = \left(\frac{48}{400} \right) (100\%) = 12\%$$

EASY

3. When calculating the cost of attending college, the forgone salary is an:

- a. Opportunity Cost.
- b. Accounting Cost.

↳ what you are giving up

EASY

4. In order to measure the effect of education on wages, the St. Louis Federal Reserve Bank surveyed 10,000 individuals about their years of schooling and their current income in May 2014. This data can be described as:
- a. cross-sectional data. *one-time collection of data*
 - b. time-series data.

Use the following information for the next three (3) questions:

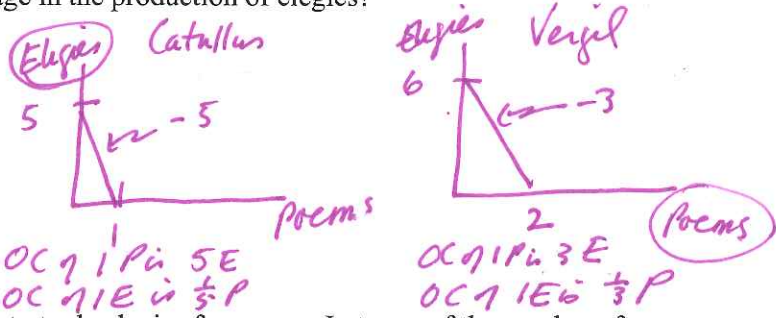
Vergil and Catullus can each produce poems and elegies. The following table expresses how many poems or elegies each can produce if they produce none of the other good. Assume opportunity costs are constant along the entire production possibility frontier for each person.

	Elegies	Poems
Catullus	5	1
Vergil	6	2

STANDARD, VERY PREDICTABLE SET OF QUESTIONS => IF YOU ARE PRACTICING REGULARLY THIS SHOULD NOT BE HARD

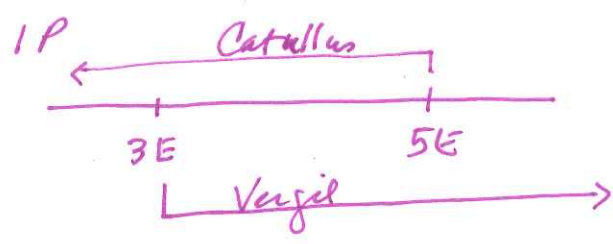
5. Who has the comparative advantage in the production of elegies?

- a. Catullus
- b. Vergil



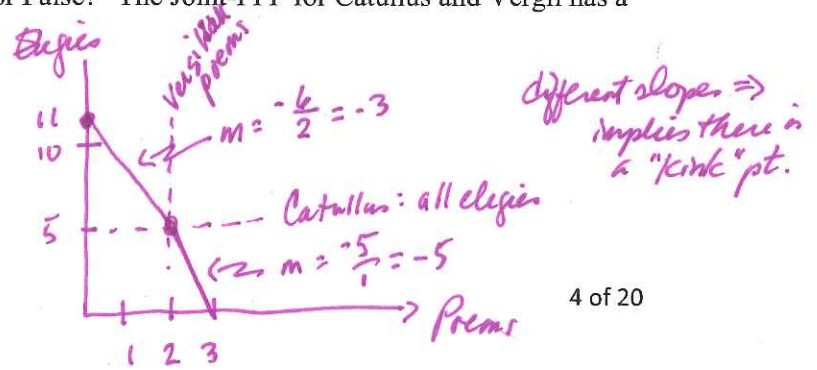
6. Suppose Vergil and Catullus wish to trade elegies for poems. In terms of the number of elegies, in what range must the price for one poem fall?

- a. Between 1/5 and 1/3 of an elegy
- b. Between 3 and 5 elegies



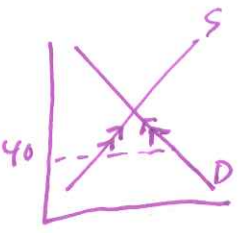
7. Is the following statement True or False? "The Joint-PPF for Catullus and Vergil has a kink point."

- a. True
- b. False



EASY

8. The founder of Snapchat (a software company) wants to create a market for Shares of his company. Snapchat's employees currently own all the Shares, and will supply some of them in the market depending on what the price is. The founder isn't sure what the equilibrium price should be, so he initially sets the price of a Share at \$40. However, demand is higher than anticipated, leading to excess demand at the initial price of \$40. Which of the following describes what will happen next in this market?



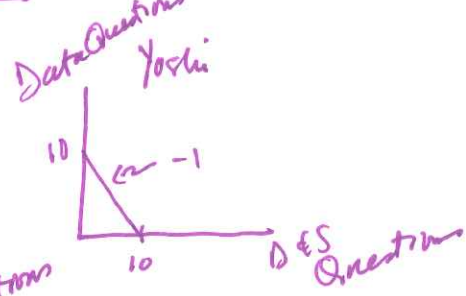
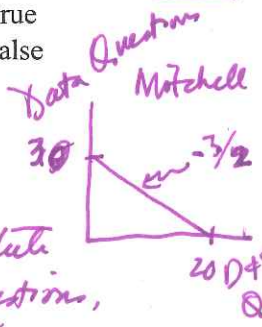
- a. The price of Snapchat's Shares will stay at \$40, and some people who want to buy Shares for \$40 will not be able to.
- b. The employees selling Shares will realize they can charge more than \$40 for each Share they sell. As the price they charge increases, the quantity of Shares demanded falls, and the quantity supplied by the employees rises.

Use the following information for the next two (2) questions:

Mitchell and Yoshi study together for their Econ 101 class. This week they are working on Demand & Supply questions and Data questions.

- 9. If Mitchell has an absolute advantage in answering Demand & Supply questions, then he also has a comparative advantage in answering Demand & Supply questions.
 - a. True
 - b. False

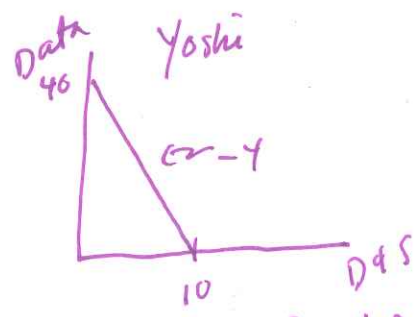
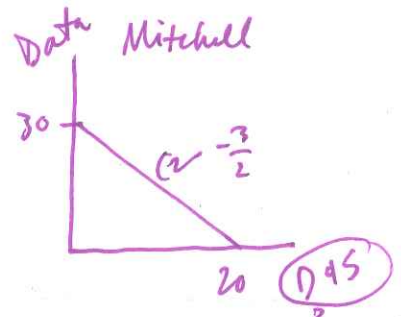
for example:
here's an example where Mitchell has absolute adv. in D&S questions, but does not have comp. adv. in that good!



HAVE TO BE ABLE TO ABSTRACTLY REASON HERE - THIS TAKES PRACTICE!

- 10. If Mitchell has an absolute advantage in answering Demand & Supply questions and Yoshi has an absolute advantage in answering Data questions, then Mitchell has a comparative advantage in answering Demand & Supply questions.
 - a. True
 - b. False

here's an example that fits the given information

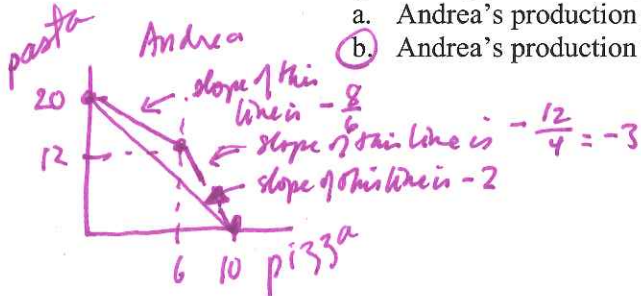


O.C. of D&S is 3/2 Data

O.C. of D&S is 4 Data

Not so hard, if you can visualize it!

11. Andrea is a cook in a local Italian restaurant; he is responsible for preparing pasta and pizza. We know that in 8 hours he can prepare at most 10 pizzas or 20 portions of pasta. We also know that he can prepare 6 pizzas and 12 portions of pasta. Given this information and holding Andrea's resources, technology and his time available for producing pasta and/or pizza constant, which sentence is true?

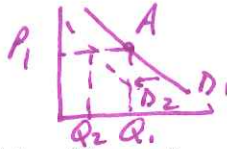


Since we know $(0, 20)$, $(10, 0)$ and $(6, 12)$ are all on his PPF, we can then check to see if they all "sit" on a straight line \Rightarrow they don't!

12. We know that good A is an inferior good, therefore when income increases:

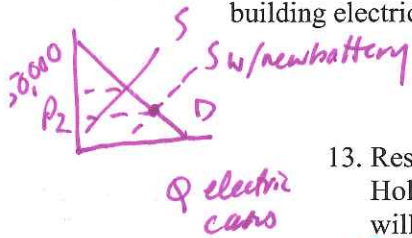
- a. demand for good A will shift to the right.
- b. demand for good A will shift to the left.

Income \uparrow , Q^d of an inferior good \downarrow at a given price



Use the following information for the next two (2) questions:

In the market for electric cars, the initial equilibrium price is \$50,000. One of the main costs of building electric cars is the large battery needed to operate these cars.



13. Researchers at UW-Madison invent a new electric battery that is cheaper to produce. Holding everything else constant, if electric car producers adopt this new technology, it will cause:

- a. the equilibrium price of electric cars to decrease.
- b. the equilibrium price of electric cars to increase.

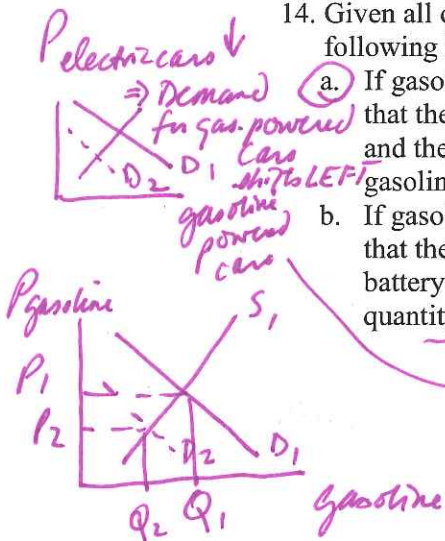
EASY

Now consider the market for gasoline-powered cars. We know these gasoline-powered cars are a substitute good for electric cars.

Hard Question!

14. Given all of the above information (including that in the last question) which of the following is TRUE?

- a. If gasoline is a complementary good for the gasoline-powered cars, then we predict that the demand for gasoline will shift left due to the introduction of the new battery and the equilibrium price of gasoline will decrease and the equilibrium quantity of gasoline will decrease. ✓
- b. If gasoline is a complementary good for the gasoline-powered cars, then we predict that the demand for gasoline will shift right due to the introduction of the new battery and the equilibrium price of gasoline will increase and the equilibrium quantity of gasoline will increase. ✗



Price of gasoline powered cars \downarrow
 Quantity of gasoline powered cars \downarrow
 \Rightarrow Price of gas cars \downarrow ; gasoline is complement \Rightarrow Demand for gasoline shifts LEFT

MULTIPLE CHOICE QUESTIONS (20 QUESTIONS WORTH 3.5 POINTS EACH)

Use the following information for the next two (2) questions:

Alice, Bob, and Charlene can each produce Widgets and Gadgets. The following table expresses how many widgets or gadgets each can produce if they produce none of the other good. Assume opportunity costs are constant along the entire production possibility frontier for each person.

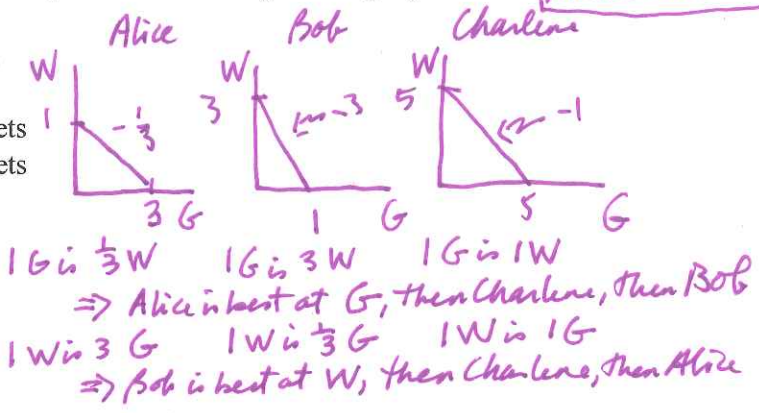
Linear PPFs

	Widgets	Gadgets
Alice	1	3
Bob	3	1
Charlene	5	5

#15, #16;
VERY PREDICTABLE SET: COULD BE TIME CONSUMING IF YOU DON'T USE ANSWER ELIMINATION METHOD!

15. Who has the comparative advantage in the production of widgets and gadgets respectively?

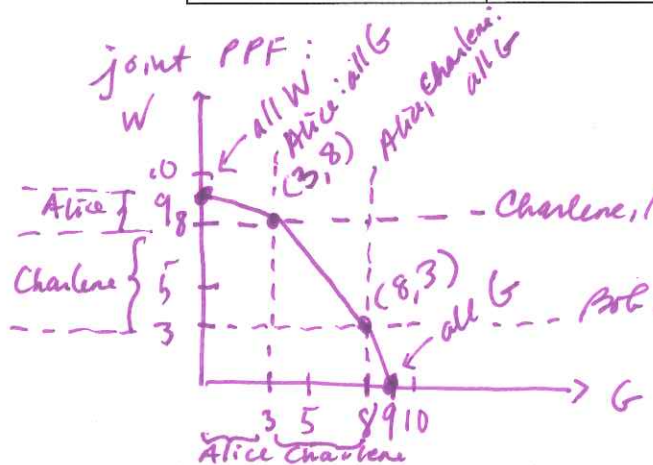
- a. Alice in widgets; Bob in gadgets
- b. Bob in widgets; Alice in gadgets**
- c. Alice in widgets; Charlene in gadgets
- d. Charlene in both widgets and gadgets



Comment: A lot of work here if you find the equations for all three linear segments of the PPF. Much less work if you find just the top segment and check the answers offered. Plus, doing the shortened version takes less paper!

16. Which of the following equations expresses the equation for the Joint Production Possibility Frontier for Alice, Bob, and Charlene? Let W be the number of Widgets and G be the number of Gadgets. Assume G is the horizontal variable.

Multiple Choice Answer to Bubble In			
a.	$W = 9 - 3G$ for $0 \leq G \leq 1$	$W = 7 - G$ for $1 \leq G \leq 6$	$W = 3 - (1/3)G$ for $6 \leq G \leq 9$
b.	$W = 9 - (1/3)G$ for $0 \leq G \leq 3$	$W = 11 - G$ for $3 \leq G \leq 8$	$W = 27 - 3G$ for $8 \leq G \leq 9$
c.	$W = 9 - (13/3)G$ for $0 \leq G \leq 1$	$W = 6 - (4/3)G$ for $1 \leq G \leq 3$	$W = 5 - G$ for $3 \leq G \leq 9$
d.	$W = 5 - G$ for $0 \leq G \leq 2$	$W = (9/2) - (3/4)G$ for $2 \leq G \leq (14/3)$	$W = (27/3) - (24/14)G$ for $(14/3) \leq G \leq 9$



Top Segment of PPF: $W = 9 - \frac{1}{3}G$ for $0 \leq G \leq 3$
 Second Segment: $W = 11 - G$ for $3 \leq G \leq 8$
 Third Segment: $W = 27 - 3G$ for $8 \leq G \leq 9$
 Check answers here
 (b) looks like the winner! No more work needed

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Use the following information for the next two (2) questions:

There are two lines, line A and line B, and they are defined by the following equations:

Line A: $Y = 3X + 1$
Line B: $Y = 9 - X$

$$\begin{aligned} 3X + 1 &= 9 - X \\ 4X &= 8 \\ X &= 2 \end{aligned}$$

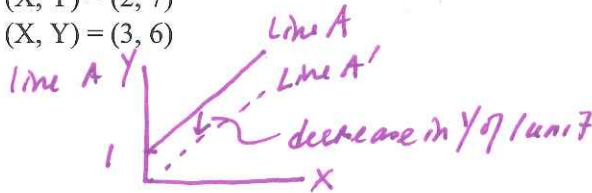
$$\begin{aligned} Y &= 3(2) + 1 = 7 \\ Y &= 9 - 2 = 7 \\ (X, Y) &= (2, 7) \end{aligned}$$

Easy!

EASY

17. What is the intersection point of Line A and Line B?

- a. $(X, Y) = (2, 6)$
- b. $(X, Y) = (3, 7)$
- c. $(X, Y) = (2, 7)$
- d. $(X, Y) = (3, 6)$



\Rightarrow Line A':
 $Y = 3X$

Suppose that there is a change in the lines. Line A has shifted: for every value of X the value of Y decreases by 1. Also Line B has shifted: for every value of Y the value of X increases by 3.

18. What is the new intersection point of these two new lines?

- a. $(X, Y) = (2, 9)$
- b. $(X, Y) = (3, 10)$
- c. $(X, Y) = (2, 10)$
- d. $(X, Y) = (3, 9)$

Line B Y
for every Y, the value of X ↑ by 3

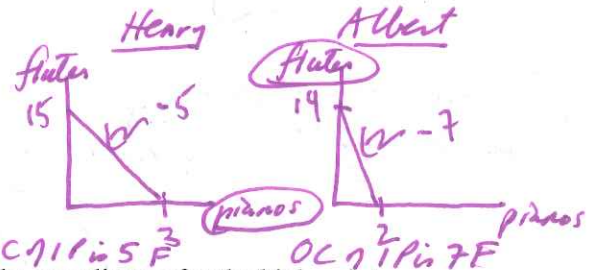


Line B': $Y = 6 - X$ and the line includes $(3, 9)$ or $(12, 0)$: use one of these pts to find new "b" value
 $0 = 6 - 12 \Rightarrow 6 = 12$

Line B': $Y = 12 - X$

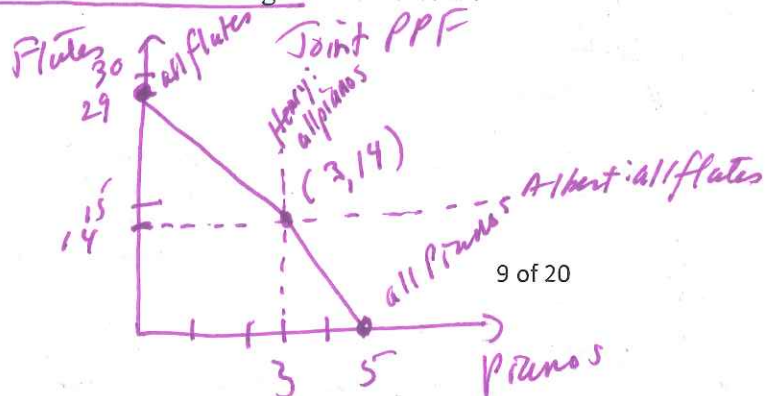
19. Henry and Albert are both instrument makers. The following table expresses how many pianos or flutes each can produce if they produce none of the other instrument. Assume opportunity costs are constant along the entire production possibility frontier for both Henry and Albert.

	pianos	flutes
Henry	3	15
Albert	2	14



If Henry and Albert go into business together, what will be the coordinates for the kink point of their joint-PPF? Assume pianos are measured as the horizontal good and flutes are measured as the vertical good.

- a. (Pianos, flutes) = (2, 14)
- b. (Pianos, flutes) = (2, 15)
- c. (Pianos, flutes) = (3, 14)
- d. (Pianos, flutes) = (3, 15)



**PREDICTABLE:
SOME
WORK**

**SOME
WORK**

Let Line A' = Line B'
 $3X = 12 - X'$
 $4X' = 12$
 $X' = 3$
 $Y' = 3X' = 3(3) = 9$
 $Y' = 12 - X' = 12 - 3 = 9$
 $(X', Y') = (3, 9)$

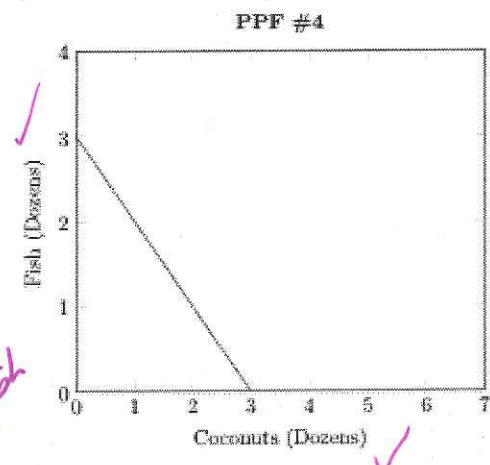
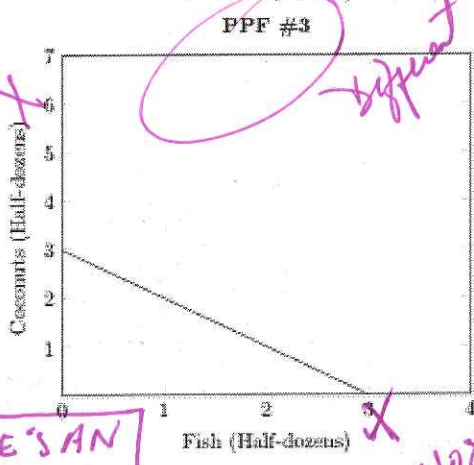
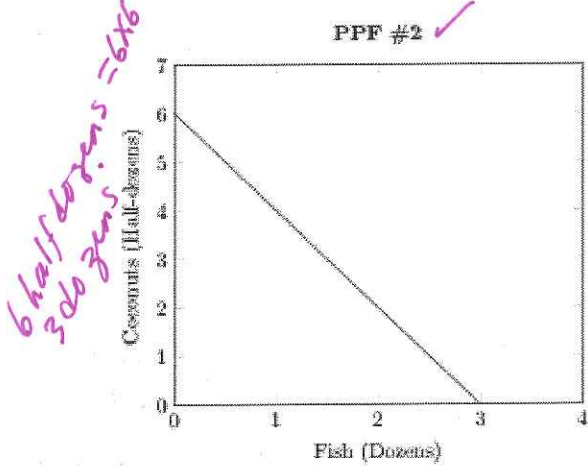
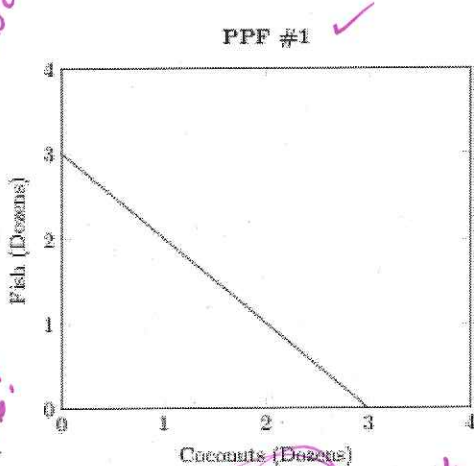
EASY: PARTICULARLY IF YOU DID A FEW PRACTICE MIDTERMS FROM CLASS WEBSITE

20. Which of the following four graphs represents a different production possibility frontier than the other graphs?

3 dozen fish = 36 fish
3 dozen coconuts = 36 coconuts

3 half dozen coconuts = 18 coconuts
3 x 6 = 18 coconuts ≠ 36!

6 half dozens = 6 x 6 = 36 coconuts
3 dozen = 36 coconuts



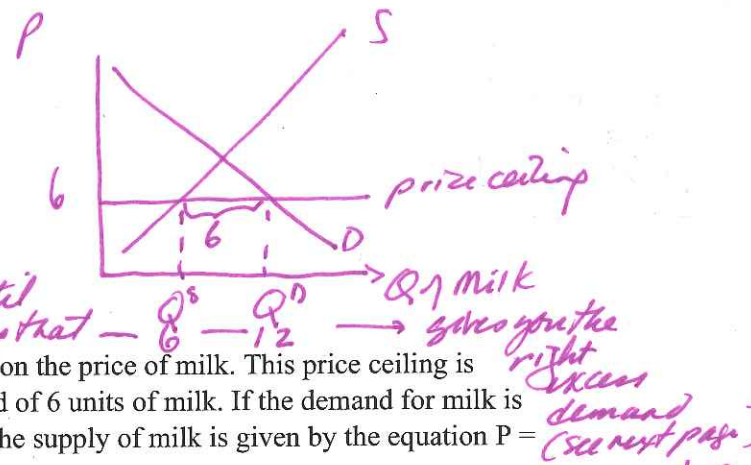
#21: THERE'S AN EASY WAY OR A HARD WAY - I GIVE YOU BOTH

- a. PPF #1
- b. PPF #2
- c. PPF #3
- d. PPF #4

3 half dozen fish = 18 fish
3 x 6 = 18 fish ≠ 36 fish

This question requires some thinking

An alternative approach: plus in provided answers until you find a price ceiling



Check: if the price ceiling is \$6 then

D: $P = 30 - 2Q^D$
 $6 = 30 - 2Q^D$
 $2Q^D = 24$
 $Q^D = 12$
 S: $P = Q^S$
 $6 = Q^S$
 $Q^D - Q^S = 12 - 6 = 6$ units of excess demand

21. The government imposes a price ceiling on the price of milk. This price ceiling is effective and results in an excess demand of 6 units of milk. If the demand for milk is given by the equation $P = 30 - 2Q$, and the supply of milk is given by the equation $P = Q$, then the price ceiling must be equal to:

- a. \$10
- b. \$6
- c. \$14
- d. \$4

At the price ceiling price $\rightarrow Q^S + \text{Excess demand} = Q^D$
 $\rightarrow Q^S + 6 = Q^D$
 D: $P = 30 - 2Q^D$
 $2Q^D = 30 - P$
 $Q^D = 15 - \frac{1}{2}P$
 S: $P = Q^S$
 $P + 6 = 15 - \frac{1}{2}P$
 $\frac{3}{2}P = 9$
 $P = 9(\frac{2}{3})$
 $P = 6$

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Here's an easier path to the answer for #21!

if $P = \$10$

$$D: 10 = 30 - 2Q^D$$

$$2Q^D = 20$$

$$Q^D = 10$$

$$S: P = Q^S$$

$$10 = Q^S$$

$$Q^D - Q^S = 10 - 10 \Rightarrow \text{no excess demand!}$$

if $P = \$6$

$$D: 6 = 30 - 2Q^D$$

$$24 = 2Q^D$$

$$Q^D = 12$$

$$S: P = Q^S$$

$$6 = Q^S$$

$$Q^D - Q^S = 12 - 6 = 6 \text{ units excess demand!}$$

Here's your answer \Rightarrow price ceiling needs to be at \$6

Use the following information for the next two (2) questions:

Mitchell and Yoshi work together to write Econ 101 questions for the upcoming midterm. They have to write binary-choice and multiple-choice questions. They each have 10 working hours per day.

- Mitchell's efficient production level contains the two points: (multiple-choice, binary-choice) = (10,10) and (20,5).
- Yoshi's efficient production level contains the two points: (multiple-choice, binary-choice) = (1,36) and (8, 8).

Both Mitchell and Yoshi have linear production possibility frontiers.

SOMEWAT HARDER

This one is a bit harder to do.

22. Now Mitchell and Yoshi agree to trade multiple-choice questions for binary-choice questions. Which of the following statements is true?
- Mitchell will trade 1 multiple choice questions for 1/4 binary choice questions from Yoshi. ~~X~~
 - Yoshi will trade 1 multiple choice questions for 1 binary choice question from Mitchell. ~~X~~
 - Mitchell will trade 1 multiple choice questions for 3 binary choice questions from Yoshi. ✓
 - Yoshi will trade 1 multiple choice questions for 2 binary choice questions from Mitchell. ~~X~~

#23: THERE'S AN EASY WAY OR A HARD WAY: WHICH PATH DID YOU TAKE?

Mitchell has comp adv in MC \Rightarrow This rules out answers (b) and (d) since Yoshi will be trading BC and not MC

23. Suppose that Mitchell and Yoshi decide they will work together to generate all questions. Which of the following allocations of production lie on their joint PPF?
- Mitchell writes 30 multiple-choice questions; Yoshi writes 1 multiple-choice question and 36 binary-choice questions. ✓
 - Mitchell writes 20 multiple-choice questions and 20 binary-choice questions; Yoshi writes 8 multiple-choice questions and 30 binary-choice questions
 - Yoshi writes 10 multiple-choice questions; Mitchell writes 15 binary-choice questions.
 - Mitchell writes 8 multiple-choice questions and 18 binary-choice questions; Yoshi writes 6 multiple-choice questions and 32 binary-choice questions.

Once you see that answer (a) works, you can stop there - takes confidence in your own work - I went ahead & proved that (a) was the only answer.

Answer a: 31 MC, 36 BC \Rightarrow check $BC = 160 - 4MC$
 $BC = 160 - 4(31)$
 $BC = 160 - 124 = 36$

$(MC, BC) = (31, 36)$ does sit on PPF

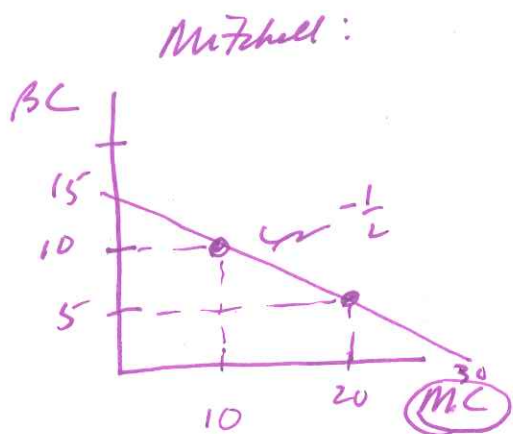
Answer b: 28 MC, 50 BC \Rightarrow check $BC = 55 - \frac{1}{2}(28)$ $(MC, BC) = (28, 50)$
 $BC = 55 - 14 = 41$ vs. $(MC, BC) = (28, 41)$

this point lies beyond PPF

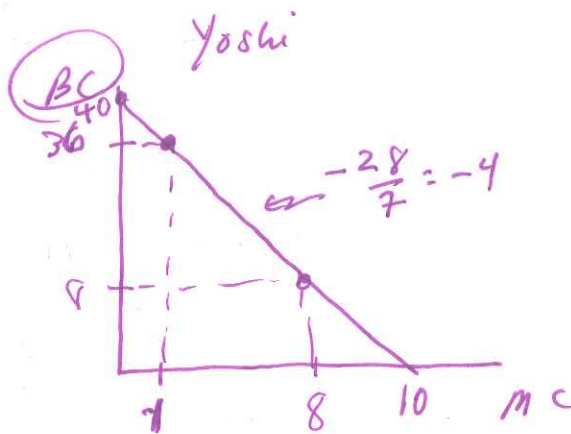
Answer c: 10, MC, 15 BC \Rightarrow lies inside PPF

Answer d: 14 MC, 50 BC \Rightarrow check $BC = 55 - \frac{1}{2}(14) = 48$
 $(MC, BC) = (14, 48)$ lies on PPF so
 $(MC, BC) = (14, 50)$ lies beyond PPF

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$$BC = 15 - \frac{1}{2} MC$$



$$BC = b - 4MC$$

$$8 = b - 4(8)$$

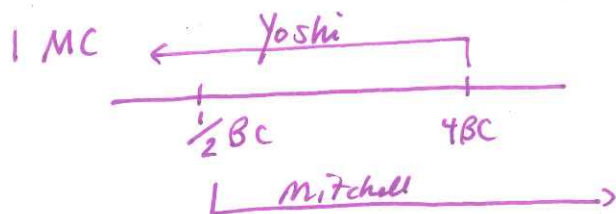
$$8 = b - 32$$

$$40 = b$$

$$BC = 40 - 4MC$$

OC of 1 MC is $\frac{1}{2} BC$
 OC of 1 BC is 2 MC

OC of 1 MC is 4 BC
 OC of 1 BC is $\frac{1}{4} MC$



Joint PPF:
 Top Segment of PPF:

$$BC = 55 - \frac{1}{2} MC$$

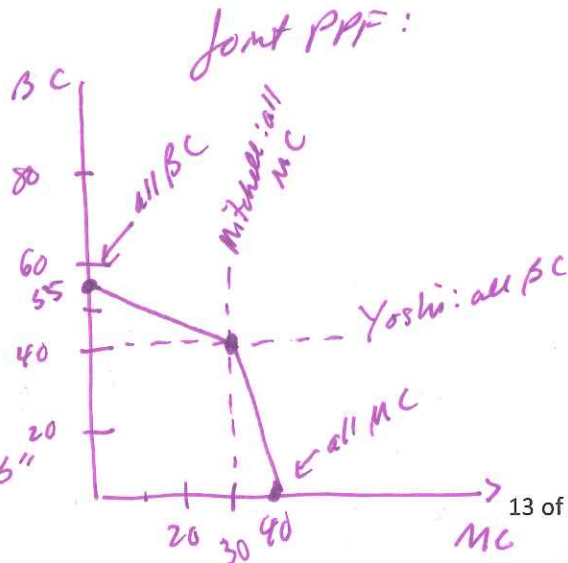
Bottom Segment of Joint PPF:

$BC = b - 4MC$ used (30, 40) or (40, 0) to find "b"

$$40 = b - 4(40)$$

$$160 = b$$

$$BC = 160 - 4MC$$

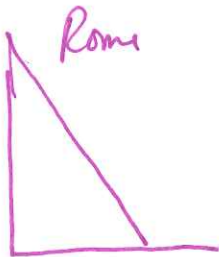


FAIRLY EASY

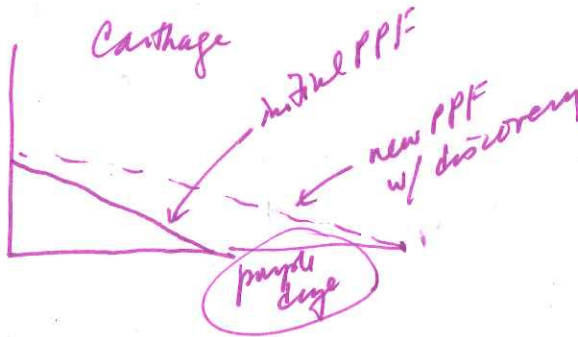
24. Rome and Carthage both produce purple dye. Currently, Carthage has the comparative advantage in the production of purple dye. Now, suppose a new source of murex snails, the primary input in the production of purple dye, is discovered off the coast of Carthage. Taking into account this discovery, all else being equal, which of the following must be true?

- a. Carthage now has absolute advantage in the production of purple dye.
- b. Rome now has absolute advantage in the production of purple dye.
- c. Rome now has comparative advantage in the production of purple dye. ~~X~~
- d. Carthage maintains its comparative advantage in the production of purple dye. ✓

not enough info for this conclusion



purple dye



PREDICTABLE - AND IF YOU USE ANSWER ELIMINATION TECHNIQUE IT'S NOT SO BAD!

25. John and Bobby love to play golf. The following equations provide their individual demand curves for golf where P is the price for a round of 18 holes of golf and Q is the number of 18 hole rounds:

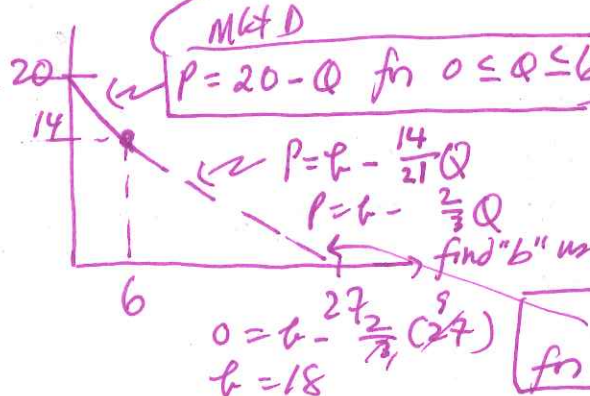
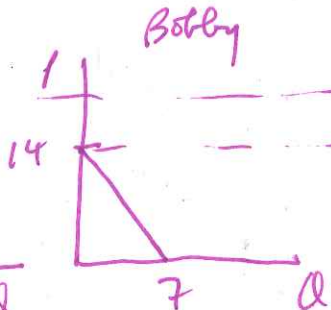
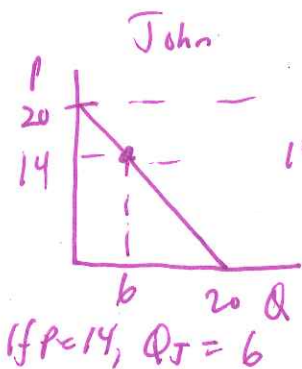
John's Demand for golf: $Q_J = 20 - P$

Bobby's Demand for golf: $Q_B = 7 - (1/2)P$

$P = 20 - Q_J$
 $\frac{1}{2}(P) = 7 - Q_B$
 $P = 14 - 2Q_B$

Suppose that John and Bobby are the only two golfers in the market. What is the market demand curve for golf?

Multiple Choice Answer to Bubble In		
a. ✓	$P = 20 - Q$ ✓ if $0 \leq Q \leq 6$	$P = 18 - (2/3)Q$ ✓ if $6 \leq Q \leq 27$
b. X	$P = 27 - (3/2)Q$ X if $0 \leq Q \leq 14$	$P = 20 - Q$ if $14 \leq Q \leq 20$
c. X	$P = 40 - Q$ X if $0 \leq Q \leq 24$	$P = 32 - (2/3)Q$ if $24 \leq Q \leq 48$
d. X	$P = 48 - (3/2)Q$ X if $0 \leq Q \leq 24$	$P = 40 - Q$ if $16 \leq Q \leq 40$



*Check answers here! - Save time!
 Answer (a) is only one that could be right!*

$P = 18 - (\frac{2}{3})Q$
for $6 \leq Q \leq 27$

Use the following information for the next two (2) questions:

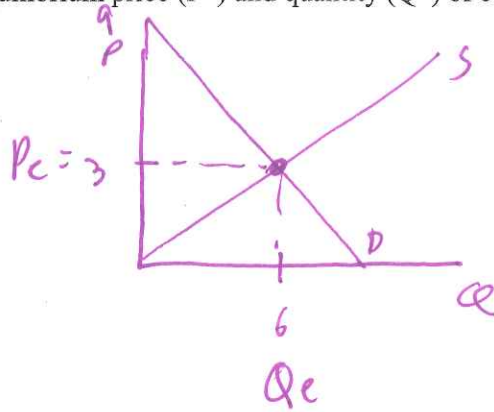
Consider the market for corn where the market is described by the following equations where Q is the quantity of corn and P is the price in dollars per unit of corn:

Market Demand for corn: $Q_D = 9 - P$

Market Supply of corn: $Q_S = 2P$

26. Given the above information, find the equilibrium price (P^*) and quantity (Q^*) of corn. EASY

- a. $P^* = \$6, Q^* = 6$ units of corn ~~x~~
- b. $P^* = \$3, Q^* = 3$ units of corn ~~x~~
- c. $P^* = \$6, Q^* = 3$ units of corn ~~x~~
- d. $P^* = \$3, Q^* = 6$ units of corn



$$9 - P = 2P$$

$$9 = 3P$$

$$P_e = 3$$

$$Q^D = 9 - 3 = 6$$

$$\therefore Q^S = 2(3) = 6$$

This is a Challenging Question to Visualize

NOT SO HARD IF YOU CAN "SEE" IT

27. Suppose that in this market for corn price is NOT determined by market forces. Instead the government sets the price of corn and then the government promises to buy back any surplus of corn that occurs at this set price. When the government implements this price, we know that the value of Consumer Surplus is \$8 and the value of Producer Surplus is \$25. Furthermore, we also know that with this government program there is an excess supply of corn in the market. Given this information and holding everything else constant, then when this government program is implemented:

- a. There will be a shortage of 3 units of corn in the market.
- b. There will be a surplus of 3 units of corn in the market.
- c. There will be a shortage of 6 units of corn in the market.
- d. There will be a surplus of 6 units of corn in the market.

← These are the ONLY 2 answers to consider

Price Support Program: Govt setting a price & buying surplus

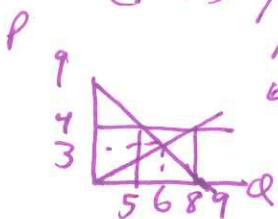
$CS = 8$
 $PS = 25$

General image \longrightarrow

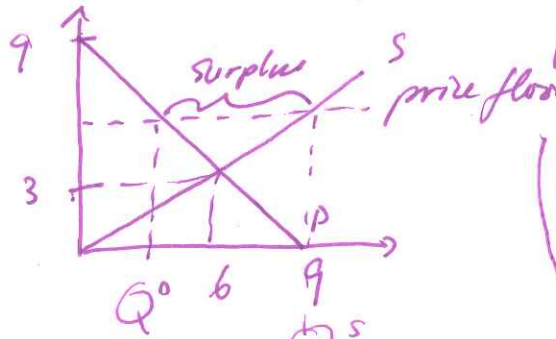
$Q^D + \text{surplus} = Q^S$

if surplus is 3, then

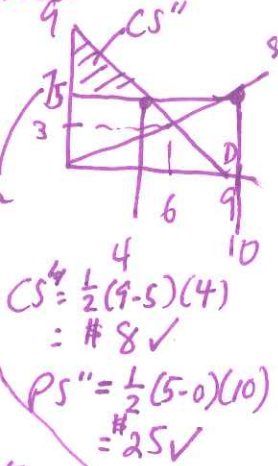
$(9 - P) + 3 = 2P$
 $12 = 3P$
 $P = 4; Q^D = 5; Q^S = 8$
 $\leftarrow CS = \frac{1}{2}(5)(5) = 12.50 \times$



Wrong answer
 \therefore Surplus must be 6 units!



Proof: if surplus is 6, then
 $(9 - P) + 6 = 2P$
 $15 = 3P$
 $P = 5; Q^D = 4; Q^S = 10$



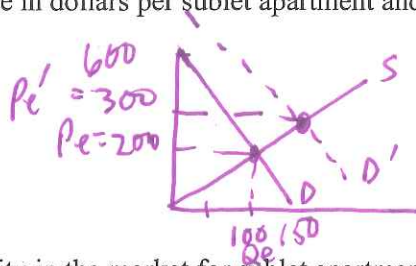
$CS = \frac{1}{2}(4)(9-5) = \#8 \checkmark$
 $PS = \frac{1}{2}(5-0)(10) = \#25 \checkmark$

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EXAM CONTINUES ON NEXT PAGE

Use the following information for the next two (2) questions:

Consider the market for sublet apartments in Madison. The supply and demand for apartments are given by the following equations where P is the price in dollars per sublet apartment and Q is the quantity of sublet apartments:

Supply Curve: $P = 2Q$
 Demand Curve: $P = 600 - 4Q$



28. What is the equilibrium price and quantity in the market for sublet apartments?

EASY

- a. $P^* = \$100$ and $Q^* = 200$
- b. $P^* = \$200$ and $Q^* = 100$ ✓
- c. $P^* = \$200$ and $Q^* = 200$ ✗
- d. $P^* = \$100$ and $Q^* = 100$ ✗

$$2Q = 600 - 4Q$$

$$6Q = 600$$

$$Q_e = 100$$

$$P_e = 2(100) = 200 \quad \text{or} \quad P = 600 - 4(100) = 200$$

Suppose there is a change in the market for sublet apartments in Madison: the heating system for the on-campus dorms breaks down, increasing the demand for sublet apartments. The supply of sublet apartments remains the same. The new equilibrium price rises to $P^* = \$300$.

D shifts to the right

29. Given this information and holding everything else constant, if the slope of the new demand curve is unchanged relative to the initial demand curve, what is the equation for the new demand curve?

FAIRLY EASY

- a. $P = 900 - 4Q$ ✓
- b. $P = 700 - 4Q$
- c. $P = 800 - 4Q$
- d. $P = 600 - 2Q$

From Supply curve:
 if $P \uparrow$ to $P_e' = 300$
 then
 $P_e' = 2Q_e'$
 $300 = 2Q_e'$
 $Q_e' = 150$

So $(Q_e', P_e') = (150, 300)$

"sits" on the new demand curve & the new demand curve is parallel to initial demand curve:

$P = b - 4Q$ to find "b" use $(Q_e', P_e') = (150, 300)$

$300 = b - 4(150)$
 $b = 900$
 \Rightarrow New demand curve: $P = 900 - 4Q$

Hard

$$\frac{1}{2}P = 130 - Q^D$$

$$P = 260 - 2Q^D$$

$$\frac{1}{4}P = Q^S + 20$$

$$P = 4Q^S + 80$$

30. The market for Econ 101 textbooks is described by the following equations where P is the price in dollars per Econ 101 textbook and Q is the quantity of Econ 101 textbooks:

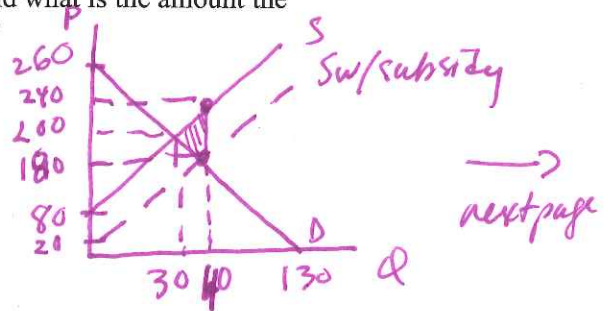
Demand Curve: $Q_D = 130 - (1/2)P$
 Supply Curve: $Q_S = (1/4)P - 20$

Given these equations, the equilibrium price is \$200 per textbook and the equilibrium quantity is 30 textbooks. The University decides to subsidize buying these textbooks and the University implements a subsidy of \$60 per textbook.

Given this subsidy program and holding everything else constant, what is the deadweight loss (DWL) due to the implementation of this subsidy and what is the amount the government spends after implementing this subsidy (G)?

The subsidy lowers the cost of the good

- a. $DWL = \$150$ and $G = \$1200$ X
- b. $DWL = \$4800$ and $G = \$300$ X
- c. $DWL = \$300$ and $G = \$2400$ ✓
- d. $DWL = \$2400$ and $G = \$150$ X



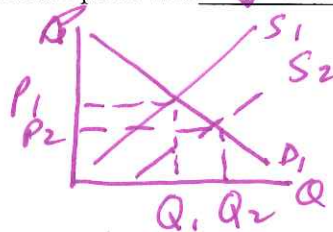
Use the following information for the next two (2) questions:

Badger Cola is the favorite soda on the UW Madison campus. The producer of Badger Cola decides to change the soda recipe. They start to use corn syrup instead of cane sugar. Using corn syrup reduces the cost of production of Badger Cola.

31. Fill in the blanks in the following sentences. The lower cost of production induces a shift right of the supply curve. The equilibrium price will ↓ and the equilibrium quantity will ↑.

Easy

- a. left; demand; decrease; decrease X
- b. right; supply; decrease; increase ✓
- c. right; demand; increase; increase X
- d. left; supply; increase; decrease X

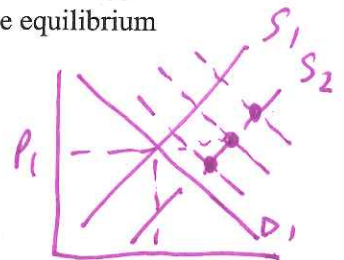


Suppose that the new recipe changes the taste of Badger Soda. The customers find that they like this new taste more than the original taste.

32. Given the change in the soda recipe and the change in taste, in the market for Badger Soda the supply curve shifts to R and the demand curve shifts to R. The equilibrium price will ? and the equilibrium quantity will ↑.

You KNEW THIS WAS COMING! PREDICTABLE, SHOULD BE EASY

- a. shifts to the right; shifts to the left; decrease; be indeterminate X
- b. shifts to the right; shifts to the right; increase; be indeterminate X
- c. shifts to the right; shifts to the right; be indeterminate; increase ✓
- d. shifts to the left; shifts to the left; be indeterminate; decrease X



EXAM CONTINUES ON NEXT PAGE

P? relative to P1

Q ↑ relative to Q1

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EXAM CONTINUES ON NEXT PAGE

$$\text{S w/ subsidy: } \boxed{P = 4Q^S + 20}$$

$$D : \boxed{P = 260 - 2Q^D}$$

New equilibrium:

$$4Q + 20 = 260 - 2Q$$

$$6Q = 240$$

$$Q = 40 \text{ textbooks}$$

$$P \text{ w/ subsidy} = 260 - 2(40) = 260 - 80 = 180$$

Govt paying \$60/textbook on 40 textbooks:

$$\text{Cost to gov} = (\$60/\text{textbook})(40 \text{ textbooks})$$

$$\text{Cost to gov} = \$2400$$

[Look to eliminate answers here - eliminate (a), (b) & (c)]

No need to calculate DWL \Rightarrow but let's do it anyway!

$$DWL = \frac{1}{2}bh$$

$$= \frac{1}{2}(\$240/\text{textbook} - \$180/\text{textbook})(40 \text{ textbooks} - 30 \text{ textbooks})$$

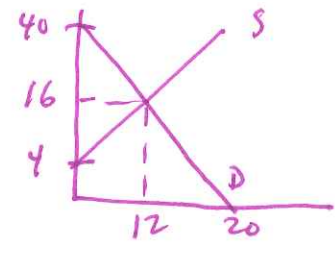
$$= \frac{1}{2}(\$60/\text{textbook})(10 \text{ textbooks})$$

$$= \$300$$

$$\frac{1}{2}P = 20 - Q^D$$

$$P = 40 - 2Q^D$$

$$P = Q^S + 4$$



Use the following information for the next two (2) questions:

The demand and supply of honey are represented by the following equations where P is the price in dollars per unit of honey and Q is the quantity of honey:

Market Demand for honey: $Q_D = 20 - (1/2)P$
 Market Supply of honey: $Q_S = P - 4$

$$Q + 4 = 40 - 2Q$$

$$3Q = 36$$

$$Q = 12$$

$$P = 16$$

SOMEWORK,
NOT HARD

33. Given the above information and holding everything else constant, what are the values of Consumer Surplus (CS) and Producer Surplus (PS) in the market for honey?

- a. CS = \$72 and PS = \$144
- b. CS = \$288 and PS = \$144
- c. CS = \$144 and PS = \$72
- d. CS = \$144 and PS = \$288

$$CS = \frac{1}{2}(40-16)(12)$$

$$= \frac{1}{2}(24)(12) = 12(12) = 144$$

[hint: did you remember $12^2 = 144$?]

[hint: eliminate answers here - (a) & (b) are eliminated]

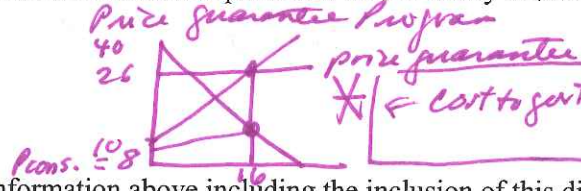
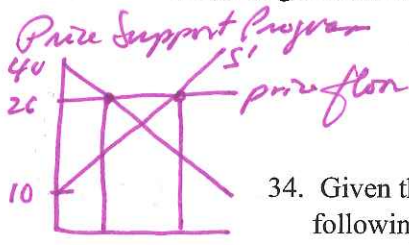
$$PS = \frac{1}{2}(16-4)(12)$$

$$PS = 6(12) = 72$$

Suppose there is a change in the market: there is a disease that is spreading to many beehives with the result that 50% of the bee population dies. This results in the supply curve shifting left. Suppose that at the initial equilibrium price (before the spread of the disease) the new quantity of honey supplied in this market falls by 50% because of this disease. Assume that the slope of the supply curve does not change with the shift in supply when you calculate the new supply curve in the market for honey.

MORE
CHALLENGING

Given the dire circumstances happening to bees, the government decides to intervene in the honey market and create an agricultural program to help bee farmers. Two programs are considered: a price support program where the government sets the price of a unit of honey at \$26 and a price guarantee program where the government guarantees bee farmers that they will receive a subsidy from the government so that the subsidized price of a unit of honey is \$26.



$$\frac{16}{16}$$

$$\frac{16}{96}$$

$$\frac{16}{256}$$

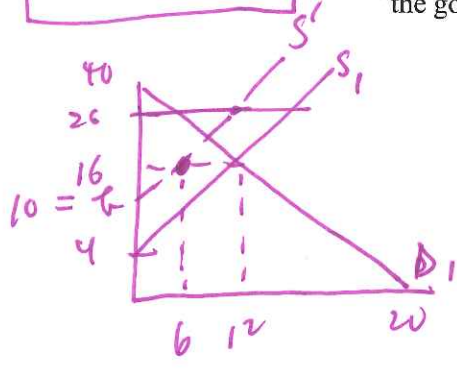
$$\frac{26}{9}$$

$$\frac{234}{9}$$

34. Given the information above including the inclusion of this disease, which of the following is FALSE?

- a. The producers are indifferent between the two programs. True \Rightarrow Prod. Rev = $26(16) =$ same $\#$
- b. The consumers prefer the price guarantee program. True, $P_{consumers} \downarrow$ lower, Q to consumers higher
- c. The government expenditure is higher under the price support program. FALSE
- d. The consumers would prefer no government intervention in the honey market over the government implementing the price support program. True

$$\text{cost to govt} = 9 \times 26 = 234$$



$$S' : P = Q^S + 10$$

but you know $(Q, P) = (6, 16)$ is on new supply curve

$$16 = Q + 10$$

$$6 = Q$$

Program I: Price Support $P = 26$

END OF THE EXAM

$$S' : P = Q^S + 10$$

Program II: Subsidy, Price Guarantee $P_g = 26$