Economics 101	Name _ANNOTATED KEY_
Spring 2015	TA Name _____
April 14, 2015	Discussion Section Number _____
Second 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 23 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:
1. 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.
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. You can find the discussion numbers below on 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 on the top of this page.
5. Use **a #2 pencil** to fill your scantron.

- **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 <u>at least</u> receiving a zero on this exam.
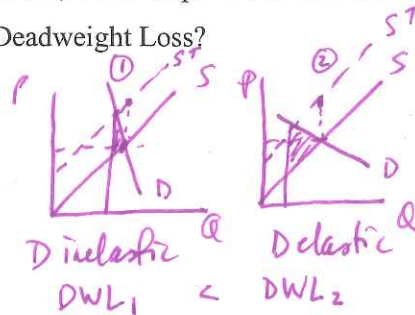
Signed _____

BINARY CHOICE QUESTIONS (14 QUESTIONS WORTH 2 POINTS EACH)

EASY

1. For a given excise tax, holding the supply curve fixed, as the slope of the demand curve becomes flatter (more elastic), what happens to Deadweight Loss?

    a. Deadweight Loss Increases

   b. Deadweight Loss Decreases

MORE CHALLENGING

2. Andrea provides tutoring service for Econ 102. The demand curve for tutoring is given by the following equation where Q is hours of tutoring and P is the price per hour of tutoring:

    $Q = 10 - (1/3) P$ ⟹ D₁

    The revenue-maximizing price for Andrea to charge is $15 per hour of tutoring. Andrea is having a lot of success as a tutor and the demand for his tutoring services increases. This new demand for his tutoring can be expressed by the following equation:

    $Q = 20 - (2/3) P$ ⟹ D₂
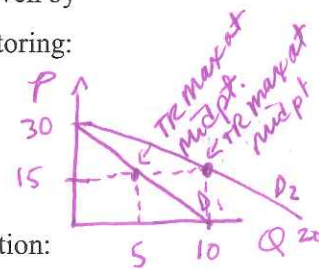
    Given this information, will Andrea maximize his revenue if he doubles the price that he charges for one of hour of tutoring?

    a. Yes, this action will maximize his revenue.

    b. No, this action will NOT maximize his revenue.

3. The cross-price elasticity of Good A with respect to the price of Good B has a positive

value. Therefore the two goods are:

a. (substitutes.)

b. complements.

$\epsilon_{xy} = \dfrac{\% \Delta Q^D_x}{\% \Delta P_y} > 0$

$X \, \text{\textit{\&}} \, y \, \text{must be substitutes}$

as $P_y \uparrow \Rightarrow \% \Delta P_y \Rightarrow +$

leads to $Q^0_x \uparrow \Rightarrow \% \Delta Q^D_x \Rightarrow +$

So as the price of good Y ↑ (Coke gets more expensive) The
individual demands more of food X (he wants more Pepsi)

4. Suppose we are studying the market for ice cream in Madison. We know that when the price

of a unit of ice cream is $10, then the demand for ice cream is equal to 20 units. We also

know that when income increases by 5%, the quantity of ice cream demanded decreases by

2 units. From this information we can conclude that in Madison ice cream is a(n) _____

good.

a. (inferior)

b. normal
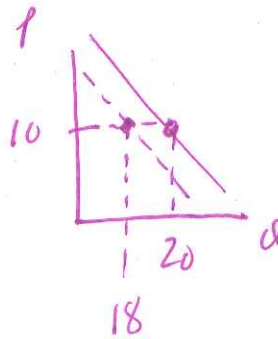
Income ↑ 5%
$Q^0_{ice cream} \downarrow$ by 2 units

As income ↑, the quantity
demanded ↓ ⇒ good
must be inferior
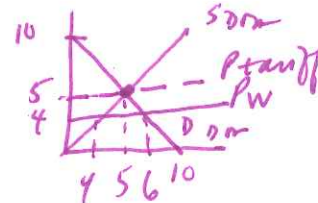
5. Consider the market for widgets in a small, closed economy. Suppose that the domestic

demand and supply curves for widgets are given by the following equations where Q is the

quantity of widgets and P is the price per widget:

Domestic Demand: $P = 10 - Q$

Domestic Supply: $P = Q$

The world price for a widget is $4.

If the government of this small economy opens this market to trade, and simultaneously,

implements a tariff of $1, then the Deadweight Loss from this policy will equal _____.

a. $0

b. ($1)

Closed economy or w/tariff

$CS = \frac{1}{2}(10-5)(5) = 12.50$

$PS = \frac{1}{2}(5-0)(5) = 12.50$

$TS_{closed \, or \, w/tariff} = \$25$

open economy

open economy - no tariff

$CS' = \frac{1}{2}(10-4)(6) = 18$

$PS' = \frac{1}{2}(4-0)(4) = 8$

$TS'_{open} = \$26$

$DWL = TS' - TS = 26-25 = 1$

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6. Andrea loves ham and cheddar cheese sandwiches. He is really precise in the type of sandwich he likes: his sandwich **always** consists of 3 slices of bread, 4 slices of ham and 2 slices of cheddar cheese. With his weekly food budget he can afford to have ham and cheddar cheese sandwiches for lunch 3 times during the week. Unfortunately for Andrea the price of cheddar cheese recently increased by 75%. Given this new price for cheddar cheese, he finds that he can now only afford ham and cheddar cheese sandwiches once a week. Given the information above, which of the following is correct?

see graph A & C are same point

a. The substitution effect explains Andrea's reduction in consumption from 3 sandwiches to 2 sandwiches a week; and the income effect explains Andrea's reduction in consumption from 2 sandwiches to 1 sandwich a week.

Income effect is C to B

b. The income effect explains all of Andrea's reduction in consumption from 3 sandwiches to 1 sandwich a week.

Ham & Cheese Sandwiches : His preferences are such that these are perfect complements — no substitutability ⇒ there is no substitution effect w/ perfect complements

cheese *A,C / B / BL2 / BL1 / Bread 'Ham*
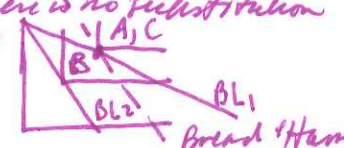
7. Suppose Yoshi has smooth, "bowl shaped" indifference curves for the two goods, coffee and tea. You are told that the price of coffee is $2 and the price of tea is $1 and that Yoshi has $10 he can spend on tea and coffee. At the consumption point (coffee, tea) = (3,4), his marginal utility of an additional cup of coffee is 4 and his marginal utility of an additional cup of tea is 3. Given this information, we can conclude that at his optimal consumption level, Yoshi consumes _____.

BL3

a. more than 4 units of tea
b. less than 4 units of tea

$$\frac{MU_{coffee}}{P_{coffee}} = \frac{4}{2} = 2 \text{ utils per dollar}$$

$$\frac{MU_{tea}}{P_{tea}} = \frac{3}{1} = 3 \text{ utils per dollar}$$

Yoshi should consume more tea & less coffee ⇒ MU_tea ↓ and MU_coffee will ↑ until $\frac{MU_{tea}}{P_{tea}} = \frac{MU_{coffee}}{P_{coffee}}$

8. Bill Gates had $80 billion in 2014. John Rockefeller had $1.6 billion in 1937. John Rockefeller's real wealth in 1937 was larger than Bill Gates' real wealth in 2014. Given this fact, which of the following relationships between the CPI in 2014 and the CPI in 1937 must be true?
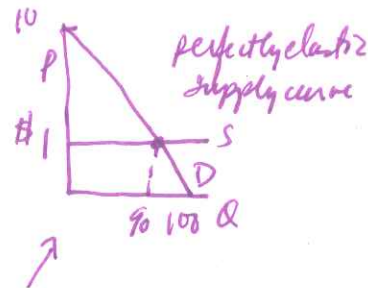
a. $CPI_{2014} / CPI_{1937} > 50$
b. $CPI_{2014} / CPI_{1937} < 50$

Bill Gates $80 B in 2014 - Nominal Income

Real Income = $\frac{\$80}{CPI_{2014}}$ *[scale]*

Rockefeller $1.6 B in 1937 - Nominal Income

Real income = $\frac{\$1.6}{CPI_{1937}}$ *[scale]*

$$\frac{1.6}{CPI_{1937}} [scale] > \frac{8.0}{CPI_{2014}} [scale]$$

$$\frac{CPI_{2014}}{CPI_{1937}} > \frac{8.0}{1.6} \Rightarrow \frac{CPI_{2014}}{CPI_{1937}} > 50$$

(handwritten top right)

10

P

1

perfectly elastic supply curve

S

D

90 100 Q

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

Econ Cafè is the only coffee shop in the Social Science building. Econ Cafè has a perfectly elastic supply curve. You are also told that Econ Cafè can provide a cup of coffee for $1. Therefore the supply curve for coffee at Econ Cafè is given by the following equation where P is the price per cup of coffee:

Supply Curve: $P = 1$

The demand for coffee that Econ Cafè faces is given by the following equation where P is the price per cup of coffee and Q is the quantity of cups of coffee:

Demand Curve: $P = 10 - (1/10) Q$

(handwritten) when $P = 1$, $Q^D = 90$

$1 = 10 - \frac{1}{10}Q$
$10 = 100 - Q$
$Q = 90$

NOT HARD

9. Given this information, the value of Consumer Surplus (CS) is _____ and the value of Producer Surplus (PS) is _____.
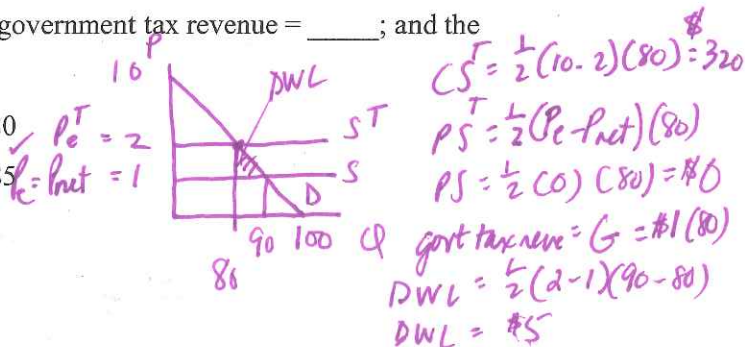
   a. CS = $405; and PS = $0
   b. CS = $0; and PS = $405

(handwritten)
$CS = \frac{1}{2}(10-1)(90) = \frac{810}{2} = \$405$

$PS = \frac{1}{2}(1-1)(90) = \frac{1}{2}(0)(90) = \$0$

NOT HARD

10. The government decides to implement an excise tax of $1 on every cup of coffee consumed at Econ Cafè. Given the above information and the implementation of this excise tax, the value of CS = _____; the value of PS = _____; government tax revenue = _____; and the deadweight loss = _____.

    a. CS = $0; PS = $320; G = $5; DWL = $80
    b. CS = $320; PS = $0; G = $80; DWL = $5

(handwritten)
16 P
DWL
S^T
S
D
90 100 Q
80
$P_e^T = 2$
$P_e - P_{net} = 1$

$CS^T = \frac{1}{2}(10-2)(80) = \$320$

$PS^T = \frac{1}{2}(P_e - P_{net})(80)$
$PS^T = \frac{1}{2}(0)(80) = \$0$

govt tax rev = $G = \$1(80)$

$DWL = \frac{1}{2}(2-1)(90-80)$
$DWL = \$5$

EASY

11. John is setting up a lemonade stand. John goes to the store and buys a folding table for $10, four 3 gallon containers for $5 per container, six hundred plastic cups for $10, 10 pounds of lemons for $20 and a juicer for $40. John can prepare 600 servings of lemonade using the 10 pounds of lemons. He will sell each cup of lemonade for $1. Given the information available, which of the following statement is TRUE?

    a. The fixed costs for John are $70.
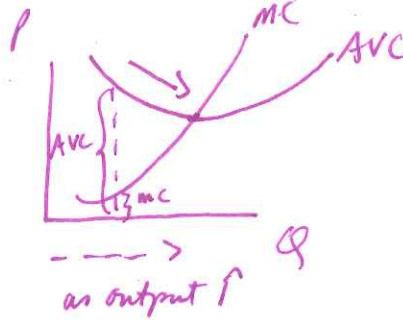   b. The fixed costs for John are $50.

(handwritten)
Fixed Cost
Table 10
4 containers 20
juicer 40
_____
70

12. As output increases, if the marginal cost curve lies below the average variable cost curve, then the average variable cost curve has:

    a. a downward slope.

    b. an upward slope.

[handwritten diagram: MC and AVC curves with price (P) on vertical axis and Q on horizontal axis; AVC bracket labels; "as output ↑" arrow below]

13. Which of the following markets is more likely to resemble perfect competition?

    a. The market for cars

    b. The market for cotton

[handwritten note: → lots of buyers and sellers / identical product / free entry & exit in LR]

14. Bob's Bagels operates in a perfectly competitive bagel industry. The price of a bagel has fallen to $2, so Bob decides to stay open until he is able to get out of his lease, which is the fixed cost of operating his business. From this information, what must be true about the cost curves for Bob's Bagels?

    a. $2 < AVC < ATC

    b. AVC < $2 < ATC

[handwritten graph: MC, ATC, AVC curves; breakeven pt and shutdown pt labeled; horizontal line at 2; q^* on horizontal axis]

[handwritten notes:]

At q^*, AVC < 2
    ATC > 2

Remember q^* is Π max quantity when
    MR = MC
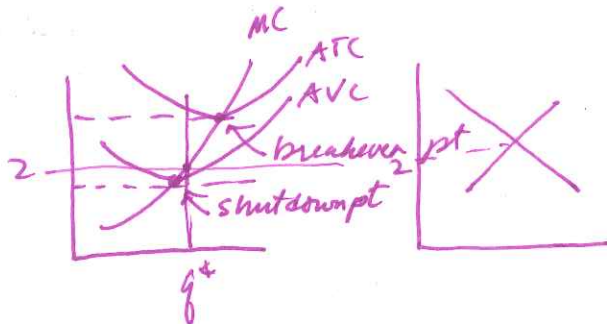
[handwritten note, right side:] If Bob is producing in SR then P must be greater than or equal to min AVC. If Bob is exiting in LR, he must be making $\Pi < 0$ in SR ⇒ so price must be equal to or greater than min AVC and equal to or less than ATC.

MULTIPLE CHOICE QUESTIONS (20 QUESTIONS WORTH 3.5 POINTS EACH)
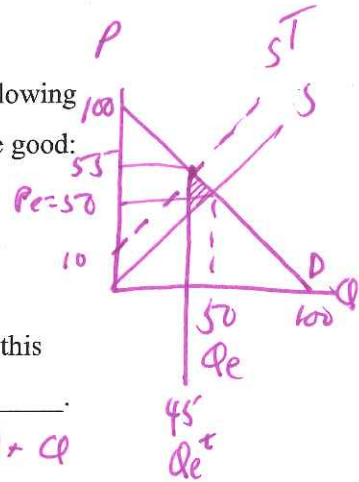
Use the following information for the next TWO (2) questions:

Suppose the supply and demand curves for a good in an economy are given by the following equations where P is the price per unit of the good and Q is the quantity of units of the good:

    Demand: $P = 100 - Q$

    Supply: $P = Q$

handwritten:
$100 - Q = Q$
$100 = 2Q$
$Q_e = 50$

handwritten:
$P_e = 50$
10

handwritten graph with: P, S^T, S, 100, 53, $P_e=50$, 10, 50, Q_e, D, Q, 100, $45°$, Q_e^T
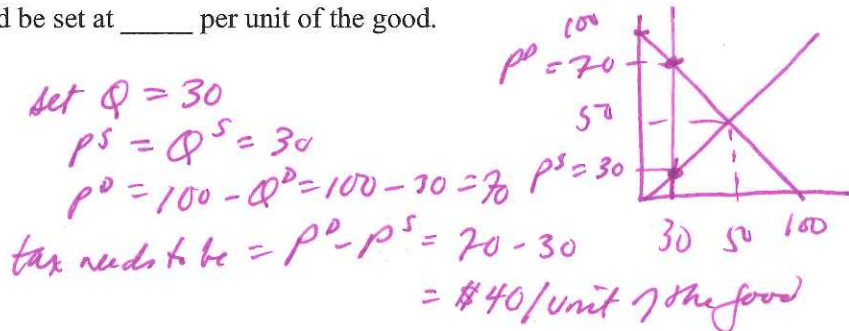
SOMEWORK *(handwritten box)*

15. Suppose the government implements an excise tax of $10 on this good. Given this information, the deadweight loss due to the implementation of this tax equals _____.

    a. $50

    b. $25 *(circled)*

    c. $10

    d. $0

handwritten:
new supply curve w/ tax: $P = 10 + Q$
$10 + Q_e^T = 100 - Q_e^T$
$2Q_e^T = 90$
$Q_e^T = 45$
$P_e^T = 100 - Q_e^T = 100 - 45 = 55$
$DWL^T = \frac{1}{2}(50-45)(\$10/unit) = \$25$

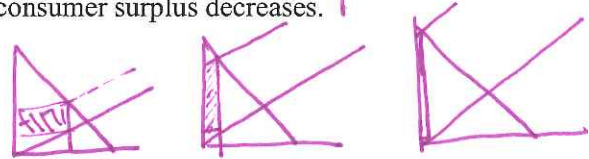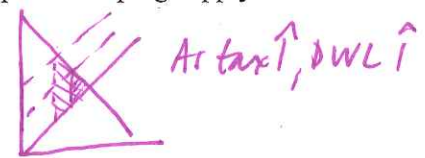**LOOKING AT FAMILIAR PROBLEM FROM NEW PERSPECTIVE** *(handwritten box)*

16. Suppose, instead of the $10 excise tax in the previous question, the government wants to implement a tax that will limit the quantity consumed of this good to 30 units. To reach this goal the excise tax should be set at _____ per unit of the good.

    a. $30

    b. $70

    c. $20

    d. $40 *(circled)*

handwritten:
set $Q = 30$
$P^S = Q^S = 30$
$P^D = 100 - Q^D = 100 - 30 = 70$ $P^S = 30$
tax needs to be $= P^D - P^S = 70 - 30$
$= \$40/unit \text{ of the good}$

handwritten graph with: 100, $P^D = 70$, 50, $P^S = 30$, 30, 50, 100

CONCEPTUAL UNDERSTANDING *(handwritten box)*

17. Which of the following statements is <u>NOT TRUE IN GENERAL</u> for an excise tax on a good with a linear downward-sloping demand curve and a linear upward-sloping supply curve?

    a. As the tax increases, government revenue increases. *(circled)* F

    b. As the tax increases, deadweight loss increases. T

    c. As the tax increases, quantity consumed decreases. T

    d. As the tax increases, consumer surplus decreases. T

handwritten: As tax ↑, DWL ↑

handwritten: As tax ↑, Total Rev eventually goes to $0

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

The following equations describe the market for cheese curds at the Memorial Union where P is the price per unit of cheese curds and Q is the quantity of cheese curd units:

Demand: $P = 70 - (3/2)Q$
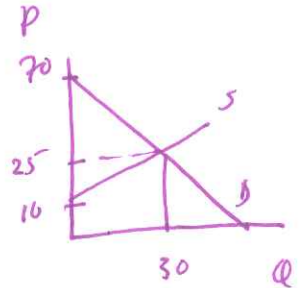
Supply: $P = 10 + (1/2)Q$

(handwritten work:)

$70 - \frac{3}{2}Q = 10 + \frac{1}{2}Q$ $P_e = 10 + \frac{1}{2}(30)$

$140 - 3Q = 20 + Q$ $P_e = 10 + 15 = 25$

$120 = 4Q$

$30 = Q_e$

18. Calculate the elasticity of demand (E_D), and supply (E_S) when the market for cheese curds is in equilibrium. (Hint: use the point slope formula for this calculation.)
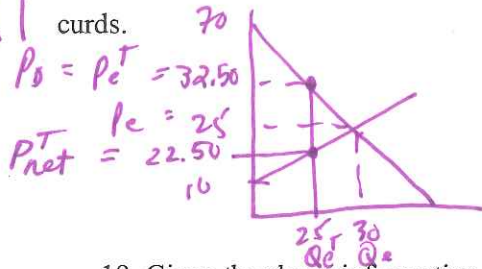
   a. $E_D = 5/9$ and $E_S = 5/3$ ✓

   b. $E_D = 4/5$ and $E_S = 5/12$

   c. $E_D = 5/4$ and $E_S = 5/12$

   d. $E_D = 9/5$ and $E_S = 5/3$

(handwritten work:)

$E^D = \left[\frac{1}{-slope}\right]\left[\frac{P}{Q}\right]$

$E^D = \left[\frac{2}{3}\right]\left[\frac{25}{30}\right] = 5/9$

$E^S = \left[\frac{1}{slope}\right]\left[\frac{P}{Q}\right]$

$E^S = \left[\frac{2}{1}\right]\left[\frac{25}{30}\right] = 5/3$

(handwritten graph with axes P and Q, values 70, 25, 10 on P axis and 30 on Q axis, curves S and D)

The government decides to introduce an excise tax on the market for cheese curds from the Memorial Union. Under the new tax regime the new equilibrium quantity is 25 portions of cheese curds.

(handwritten graph with:)
$P_D = P_e^T = 32.50$
$P_e = 25$
$P_{net}^T = 22.50$
70, 10 on axis; $25 = Q_e^T$, $30 = Q_e$

(handwritten work:)

if $Q_e^T = 25 \Rightarrow P_D = P_e^T$ is : (use demand curve)

$P_e^T = 70 - \frac{3}{2}(25) = 70 - \frac{75}{2} = \frac{140}{2} - \frac{75}{2} = \frac{65}{2} = 32.50$

if $Q_e^T = 25 \Rightarrow P_S = P_{net}^T$ is : (use supply curve)

$P_{net}^T = 10 + \frac{1}{2}(25) = 10 + 12.50 = 22.50$

19. Given the above information, which of the following sentences is **FALSE**?

   a. The DWL due to the tax is $25. T

   b. The Consumer Tax Incidence is greater than the producer tax incidence with this excise tax. T

   c. The government revenue is $250 from the implementation of this tax. T

   d. The equilibrium price paid by consumer increases by 20% due to the implementation of this excise tax. F
      → more than 20%

(handwritten work:)

$tax = P_e^T - P_{net}^T = 32.50 - 22.50 = \$10/unit$

$DWL = \frac{1}{2}(32.50 - 22.50)(30 - 25) = \frac{1}{2}(10)(5) = \$25$

$CTI = (32.50 - 25)(25)$ } CTI > PTI

$PTI = (25 - 22.50)(25)$

gov't tax rev = ($10/unit)(25 units) = $250

$P\uparrow$ for consumers from $25 to $32.50 : a 20% $\uparrow$ in price would be $25 to $30

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EXAM CONTINUES ON NEXT PAGE

Use the following information for the next __TWO (2)__ questions.

The following table gives the nominal prices for goods in Zimbabwe in 2008 and 2009:

Year	Price of the Market Basket	Price of a Cell Phone	CPI (100 point scale)
2008	$10	$50	100
2009	$200	$50,000	?

NOT HARD

20. What was the CPI in Zimbabwe for 2009 using 2008 as the base year?

    a. 200

    (b.) 2000

    c. 20000

    d. 200000

$$CPI \; in \; yr \; n = \left[\frac{Cost \; of \; mkt \; basket \; in \; yr \; n}{Cost \; of \; mkt \; basket \; in \; base \; year} \right] [scale]$$

$$CPI \; in \; 2009 = \left[\frac{200}{10} \right] [100] = 2000$$

NOT HARD

21. Using 2008 as the base year, what was the real price of a cell phone in 2009?

    a. $25

    b. $250

    (c.) $2500

    d. $25,000

$$real \; price = \left[\frac{nom \; price}{CPI_{2009}} \right] [scale]$$

$$real \; price = \frac{50,000}{2000} [100]$$

$$real \; price = \frac{5000}{2} = \$2500$$

Use the following information for the next TWO (2) questions.

Suppose the domestic supply and demand for widgets in a small domestic economy are given by the following equations where P is the price per widget and Q is the quantity of widgets:

Domestic Demand: $Q = 16 - 2P$
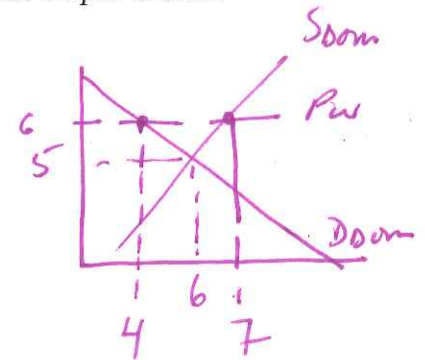
Domestic Supply: $Q = 1 + P$

The world price of a widget is $6.

22. Given this information, _____ widgets will be *exported* if this market is open to trade.

    a. 0
    b. 3
    c. 4
    d. 7

$$16 - 2P = 1 + P$$
$$15 = 3P$$
$$5 = P$$
$$Q = 1 + 5 = 6$$

if $P_W = 6$, $Q^D = 16 - 2(6)$
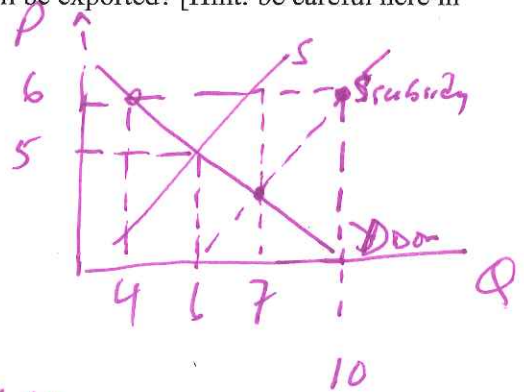$$Q^D = 4$$

if $P_W = 6$, $Q^S = 1 + 6$
$$Q^S = 7$$

Exports $= Q^S - Q^D = 7 - 4 = 3$

23. Suppose the government of this small economy provides a per unit subsidy to national producers equal to $3. Now how many widgets will be exported? [Hint: be careful here in your analysis-this is a hard question!]

(basically the reverse of a tax or another way to help domestic producers in this world mkt)

    a. 2
    b. 6
    c. 7
    d. 8

The effect of this subsidy is to shift the supply curve horizontally to the right (the vertical distance between S_{Dom} & $S_{subsidy}$ is $3). So new supply curve, $S_{subsidy}$, can be written as $P = Q - 4$
When $P = P_W = \$6$ then $Q^S_{Dom} \Rightarrow 6 = Q^S_{Dom} - 4$
$$10 = Q^S_{Dom}$$
and at $P = P_W = \$6$ then $Q^D_{Dom} \Rightarrow 4$
So Exports $= Q^S_{Dom} - Q^D_{Dom} = 10 - 4 = 6$ units

(This page is intentionally left blank as an extra work sheet.)
DO NOT DETACH THIS SHEET FROM THIS EXAM BOOKLET!
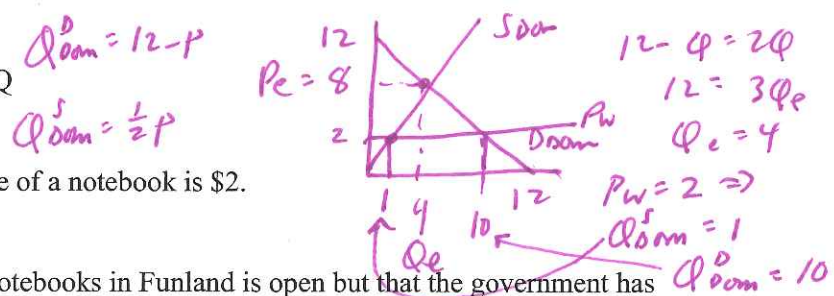EXAM CONTINUES ON NEXT PAGE

Use the following information for the next TWO (2) questions.

Suppose that Funland is a small economy and that its market for notebooks can be described by the following domestic demand and supply curves where P is the price of a notebook and Q is the quantity of notebooks:

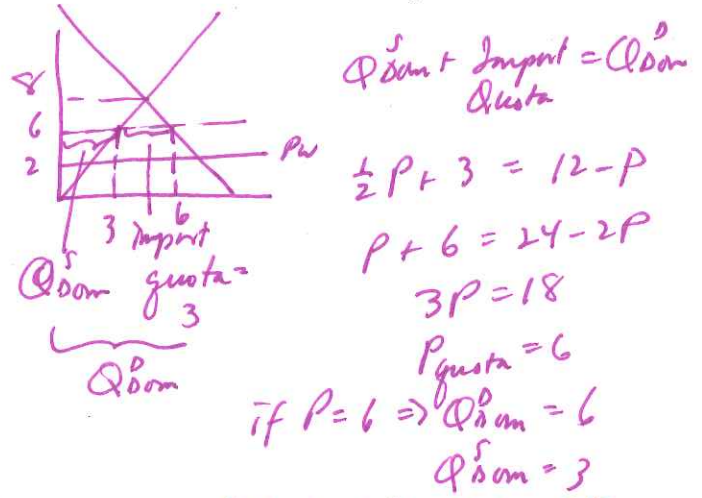Domestic Demand: $P = 12 - Q$

Domestic Supply: $P = 2Q$

You are also told that the World Price of a notebook is $2.

(handwritten annotations:)

$Q_{dom}^D = 12 - P$

$Q_{dom}^S = \frac{1}{2}P$

$12 - Q = 2Q$
$12 = 3Q_e$
$Q_e = 4$

$P_e = 8$

$P_w = 2 \Rightarrow Q_{dom}^S = 1$

$Q_{dom}^D = 10$

(LOT OF WORK)

24. Suppose that the market for notebooks in Funland is open but that the government has imposed an import quota of 3 notebooks on this market. Given this information, the license holder revenue will equal _____.

    a. $3
    b. $6
    c. $9
    d. **$12** *(circled)*

(handwritten:)

$Q_{dom}^S + Import = Q_{dom}^D$
    Quota

$\frac{1}{2}P + 3 = 12 - P$

$P + 6 = 24 - 2P$

$3P = 18$

$P_{quota} = 6$

if $P = 6 \Rightarrow Q_{dom}^D = 6$

$Q_{dom}^S = 3$

License Holder revenue = $(\$6 - \$2)(3 \, units) = \$12$

(SOME WORK)

25. Suppose the government of Funland eliminates the import quota from the previous problem and instead implements a tariff that results in a Deadweight loss of $3. Given this information, how much must this tariff be?

    a. $1 per notebook
    b. **$2 per notebook** *(circled)*
    c. $3 per notebook
    d. $4 per notebook

(handwritten:)
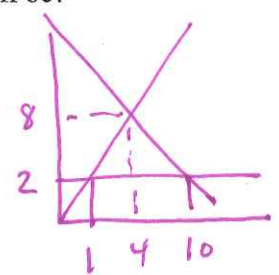
On multiple choice tests trying different answers is one approach you can try

Trial & Error:

(a) X if $P_{Tariff} = \$3 \Rightarrow Q_{dom}^D = 9$, $Q_{dom}^S = 1.50$ $\Rightarrow$ math is not working, a bit iffy

(b) if $P_{Tariff} = \$4 \Rightarrow Q_{dom}^D = 8$, $Q_{dom}^S = 2$ math nicer

$DWL = \frac{1}{2}(3-2)(1.50-1) + \frac{1}{2}(3-2)(10-9)$
$DWL \neq 3$

$DWL = \frac{1}{2}(4-2)(2-1) + \frac{1}{2}(4-2)(10-8)$
$= \$1 + \$2 = \$3$

Use the following information for the next TWO (2) questions.

There are two goods x and y in the economy. Yoshi's utility function is given by U(x,y) = xy. His marginal utility of x is MUx = y and his marginal utility of y is MUy = x.

26. Given the above information, what is his optimal consumption of goods x for each of the following cases where Px is the price of good x, Py is the price of good y, and I is income?

Case 1 (Px,Py,I) = (1,1,40)

Case 2 (Px,Py,I) = (4,1,40)

Case 3 (Px,Py,I) = (4,1,80)

a. x = 20 in Case 1; x = 10 in Case 2; and x = 15 in Case 3

b. x = 15 in Case 1; x = 5 in Case 2; and x = 10 in Case 3

c. x = 20 in Case 1; x = 5 in Case 2; and x = 10 in Case 3

d. x = 15 in Case 1; x = 10 in Case 2; and x = 15 in Case 3

(handwritten right margin):
$$\frac{MUx}{Px} = \frac{MUy}{Py} \Rightarrow \text{if } Px = Py, \text{ then } Y = X$$

① Case One since Px = Py ⇒ Y = X
I = $40; Px = 1
so use ½ of your income on X
Consume 20 units of X

② Case Two & Case Three
$$\frac{MUx}{Px} = \frac{Y}{4} ; \frac{MUy}{Py} = \frac{X}{1}$$
Y = 4X
I = Px X + Py Y
Case Two 40 = 4X + 1Y & 40 = 2Y
20 = Y
∴ X = 5 in Case 2

Case Three 80 = 4X + 1Y
80 = 1Y + 1Y
80 = 2Y
Y = 40, ∴ X = 10

Notice, that the only difference between Case 1 and Case 2 is the price of good x. We want to evaluate the effect of the price change from Case 1 to Case 2. Specifically, we want to evaluate the value of the income and substitution effects on Yoshi's demand for good x caused by the price increase from Case 1 to Case 2.

27. Which of the following are the correct values for the change in good x consumption due to the income and substitution effects given the information you have been provided and your work in the last question? (Hint: draw Case 1, Case 2 and Case 3 on the same graph.)

a. 5 unit decrease in the consumption of good x due to the income effect; 5 unit decrease in the consumption of good x due to the substitution effect

b. 5 unit decrease in the consumption of good x due to the income effect; 10 unit decrease in the consumption of good x due to the substitution effect

c. 10 unit decrease in the consumption of good x due to the income effect; 5 unit decrease in the consumption of good x due to the substitution effect

d. 10 unit decrease in the consumption of good x due to the income effect; 10 unit decrease in the consumption of good x due to the substitution effect
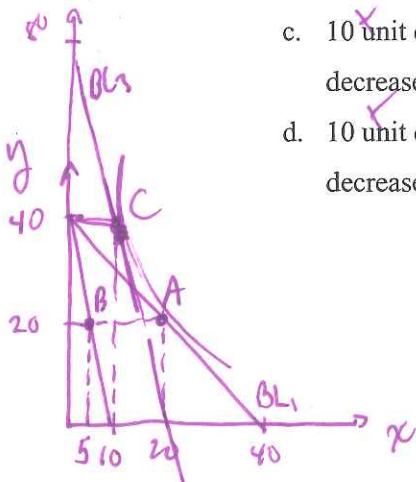
(handwritten):
A to C is substitution effect ⇒ 20 units of X to 10 units of X
↓ of 10 units of X

C to B is income effect ⇒ 10 units of X to 5 units of X
↓ of 5 units of X

28. There are two goods in an economy: beer and wine. Beer contains 10 ml of alcohol per bottle and wine contains 20 ml of alcohol per bottle. Brandon loves drinking and he gains utility only from the total amount of alcohol he consumes. The price of beer is $10 per bottle and the price of wine is $30 per bottle. Brandon's income is $150. Given the above information, which of the following is his optimal consumption bundle?

a. (Bottles of Beer, Bottles of Wine) = (6,3)
b. (Bottles of Beer, Bottles of Wine) = (3,4)
c. (Bottles of Beer, Bottles of Wine) = (15,0)
d. (Bottles of Beer, Bottles of Wine) = (0,5)

(handwritten notes)
$2B = 1W$

$P_{Beer} = 10$
$P_{wine} = 30$
$I = 150$

If he buys only beer he can afford 15 Bottles ⇒ gives him 150ml of alcohol
If he buys only wine he can afford 5 Bottles ⇒ gives him 100 ml of alcohol ⇒ he should buy ONLY Beer

29. You are a CEO (Chief Executive Officer) of a local cement company that is assumed to be operating in a perfectly competitive industry. As a CEO, you try to maximize the company's profit. Suppose the company has to pay $2500 of rent every 10 years to lease the equipment used to produce cement. The company has a variable cost function and marginal cost function given as follows where Q is the number of units of output:

Variable Cost: $VC = Q^3$

Marginal Cost: $MC = 3Q^2$

You know that the market price of a unit of cement is given by $300. Given this information, in the Long Run should the CEO renew the leasing contract for the equipment? What is the optimal level of production for this cement plant in the Long Run? The company should:

a. not renew the contract and produce 0 units of cement (the cement plant should exit the industry).
b. renew the contract and produce 5 units of cement.
c. renew the contract and produce 10 units of cement.
d. renew the contract and produce 20 units of cement.

(handwritten) $TC = Q^3 + 2500$

(handwritten notes at bottom)

Rent is Fixed Cost $= 2500$ every 10 years

$VC = Q^3$
$MC = 3Q^2$

If $P = 300 \sim MR$, then Π max Q is
$3Q^2 = 300$
$Q^2 = 100$
$Q = 10$
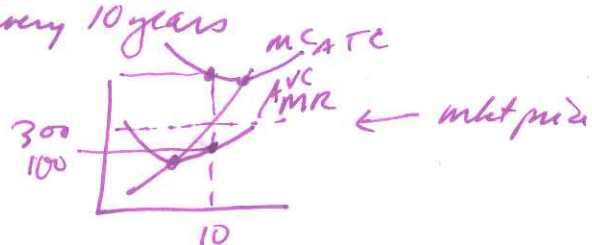
At $Q = 10$; TR $= 3000$
VC $= 10 \cdot 10 \cdot 10 = 100 \cdot 10 = 1000$ } So in SR, TR covers VC
in the future if you renew contract   TR $= 3000$, TC $= 3500$ $\Pi < 0$

(graph with labels: MC ATC, VC, AMR, 300, 100, mkt price, 10)

30. Consider a firm with increasing marginal cost and positive fixed cost. Given this information, which of the four graphs below illustrate the AVC (average variable cost) curve, the ATC (average total cost) curve and the MC (Marginal cost) curve correctly?

a. Graph A
b. Graph B
c. Graph C
d. Graph D
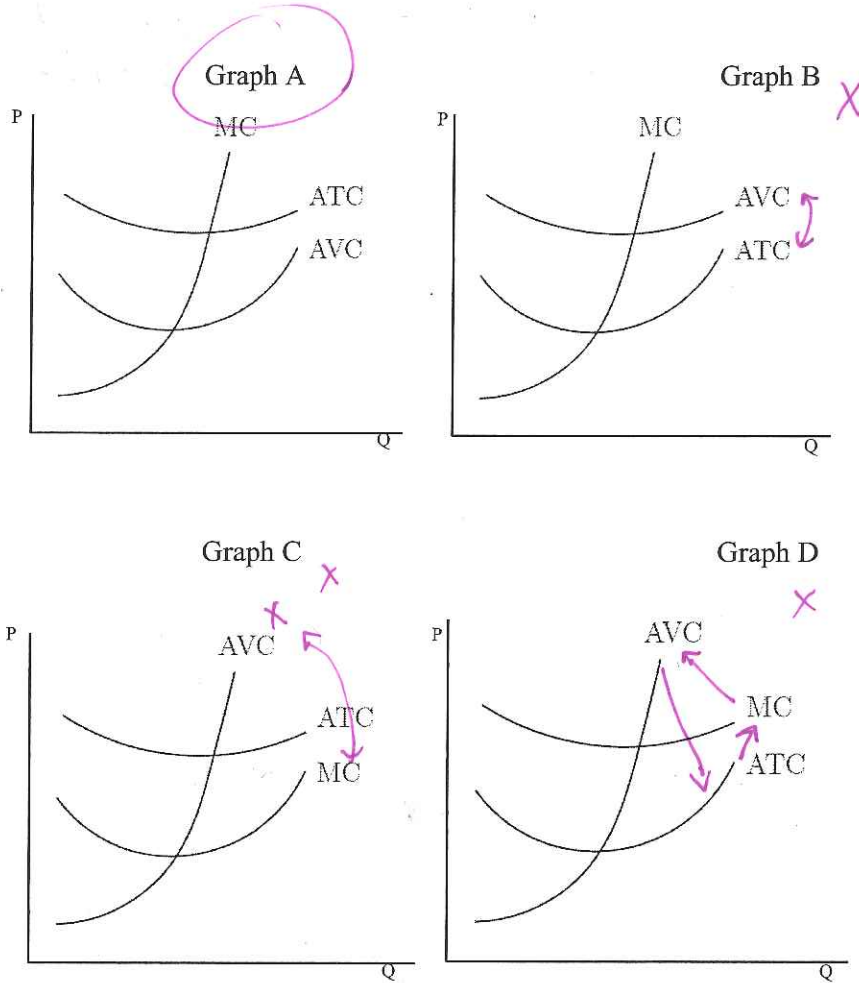
Graph A

Graph B

Graph C

Graph D

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

Consider the perfectly competitive market for cheap plastic sunglasses. All firms who produce sunglasses are identical, and have the following cost curves where q is the number of pairs of sunglasses produced by a single firm:

Marginal Cost for representative firm: $MC = 2q$

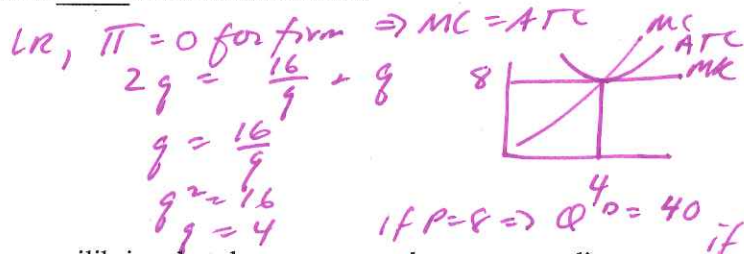Total Cost for representative firm: $TC = 16 + q^2$

The market demand for sunglasses is given by the following equation where Q is the market quantity and P is the market price:

Market demand: $P = 48 - Q$

MEDIUM

31. Given the above information, when this market is in long run equilibrium, the equilibrium price will be _____ and there will be _____ firms in this market.
    a. $2; 16 ✗
    b. $4; 12 ✗
    c. $16; 2 ✗
    d. $8; 10 ✓

Handwritten: LR, $\pi = 0$ for firm $\Rightarrow MC = ATC$

$2q = \frac{16}{q} + q$

$q = \frac{16}{q}$

$q^2 = 16$

$q = 4$

If $P = 8 \Rightarrow Q^D = 40$

if each firm produces 4 units & total production is 40, Then there are 10 firms

Suppose this market is initially in long run equilibrium but then a new weather report predicts very cloudy weather for the next ten years. This weather report causes the market demand curve to shift to this new demand curve provided by the following equation:
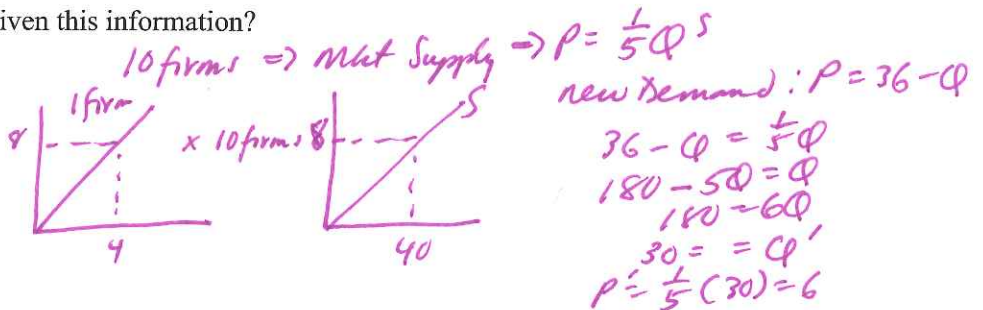
New market demand: $P = 36 - Q$

MEDIUM

32. In the short run, before any firms can enter or exit the market, what will be the new price of a pair of sunglasses given this information?
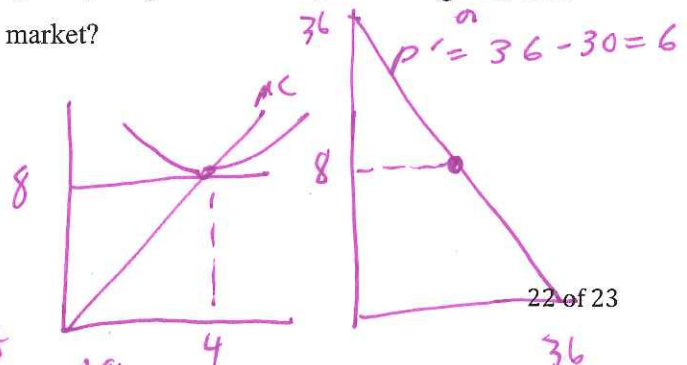   a. $2
    b. $4
    c. $6
    d. $8

Handwritten: 10 firms $\Rightarrow$ Mkt Supply $\Rightarrow P = \frac{1}{5}Q^S$

new Demand: $P = 36 - Q$

$36 - Q = \frac{1}{5}Q$

$180 - 5Q = Q$

$180 = 6Q$

$30 = Q'$

$P = \frac{1}{5}(30) = 6$

MEDIUM

33. Given the new demand curve and holding everything else constant, in the long run, what will be the total number of firms in this market?
    a. 7 firms
    b. 4 firms
    c. 6 firms
    d. 8 firms

Handwritten: $P' = 36 - 30 = 6$

We know $P_{LR} = 8 \Rightarrow$ w/ Mkt D $\Rightarrow P = 36 - Q \Rightarrow$ Q must be 28. If each firm's LR π max output is 4 units $\Rightarrow \frac{28}{4} = 7$ firms

34. Gary chooses between consuming two goods: apples and oranges. He has smooth and bowed-in indifferences curves for apples and oranges. His income is $8. When the price of oranges is $2 per pound and the price of apples is $1 per pound, he consumes 4 pounds of apples and 2 pounds of oranges.

After a bad winter in Florida, the price of oranges increases to $3 per pound of oranges. The price of apples stays at $1 per pound of apples. With these new prices Gary consumes 5 pounds of apples and 1 pound of oranges.

Given the above information, which of the following statements is TRUE?

a. Answers (b), (c) and (d) are all TRUE answers given the above information.
b. With the change in the price of oranges, Gary's marginal utility of oranges increased and his marginal utility of apples decreased compared to the initial levels for these two measures. ✓
c. The marginal utility per dollar of apples and the marginal utility per dollar of oranges for Gary are the same at the new consumption level. ✓
d. The last pound of oranges Gary consumed provided him with 3 times more utils than the last pound of apples he consumed. ✓

END OF THE EXAM

Initially   4 lbs of apples $P_A = 1$
           2 lbs of oranges $P_O = \$2$
                               $I = 8$

Then   5 lbs of apple $P_A = 1$
         1 lb of oranges $P_O = \$3$

(b) As he consumes less oranges
MU orange ↑
As he consumes more apples
MU apples ↓

(c) If Gary maximizes his utility & we assume he does then
$$\frac{MU_{orange}}{P_{orange}} = \frac{MU_{apple}}{P_{apple}}$$