**ENG 110, Spring 2012 Midterm Answers**

Multiple Choice Questions: (Each 2 points)

1. If excess demand exists in the market at the current market price, then
    A. excess supply will emerge to absorb the excess demand.
    B. quantity supplied is less than the quantity demanded.
    C. quantity demanded is less than the quantity supplied.
    D. equilibrium price is below the market price.
    E. market price will fall.

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Equilibrium Price · · · · · · · · · · · ·

Market Price · · · · · · · · · · · · · ·

Excess Demand

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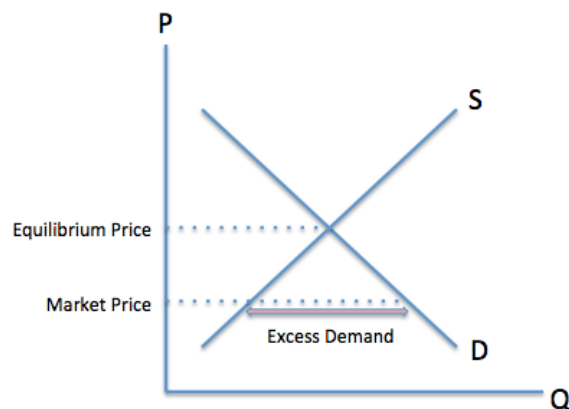
2. The basic difference between the short run and the long run is that
    A. in the short run, suppliers cannot adjust output to changes in demand.
    B. in the long run, suppliers can make any necessary adjustments to production process.
    C. in the short run, it is highly likely that a new business will enter in the market.
    D. in the short run businesses making zero economic profit must close.
   E. in the long run demanders can adjust their demands to their incomes.
    Note that, in the short run, quantity is not fixed, suppliers can change the quantity produced but the whole production process can be changed in the long run (the scale, technology etc...)

3. Which of the following will not cause a change in the supply curve for iPad?
    A. a change in the iPad battery technology
    B. a change in the resource prices associated with iPad making
    C. a widespread political unrest in China
    D. a change in the price of iPads
    E. a change in the scale of factories producing iPad
    Remember that the supply curve is the same as the MC curve, then, anything that may affect the cost and the production process will change the supply curve as a whole.

4. To maximize profits, a firm will produce where
   A. marginal revenue exceeds marginal cost by the largest amount.
   B. average total cost is at minimum.
   C. sales are maximized.
   D. marginal revenue is equal to marginal cost.
   E. marginal cost is at its lowest.

5. The firm should shut down in the long run if it cannot cover its
   A. marginal cost.
   B. total cost.
   C. fixed cost.
   D. total variable cost.
   E. average total cost.

6. In the case of pollution, the market is said to fail because
   A. the equilibrium price is higher than the optimum.
   B. the equilibrium price is less than the optimum.
   C. polluters are not punished.
   D. those who suffer from pollution are compensated outside of the market.
   E. property rights are poorly distributed.
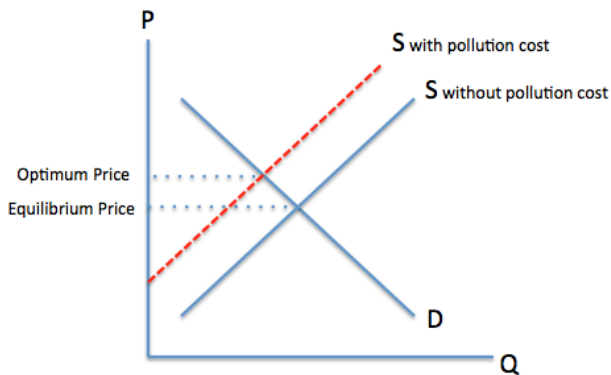
7. If a per unit tax is imposed on a producer of a good with a negative externality, then the tax shifts the producer's
   A. marginal cost curve to the right.
   B. marginal cost curve to the left.
   C. total fixed cost to the left.
   D. total fixed cost to the right.
   E. price downward.

8. Which one of the following is not a determinant of price sensitivity of total market demand for a good
   A. the availability of close substitutes.
   B. time.
   C. whether the good is a necessity or a luxury.
   D. the number of producers of the good.
   E. the cost structure of each firm producing this good.

9. When a price ceiling is imposed in a market
   A. a persistent surplus results.
   B. a persistent shortage results.
   C. sellers of the product are made better off.
   D. no one is made better off.
   E. quantity supplied is greater than quantity demanded.
   Note that even though there is a shortage, the consumers who could get the commodity at the new price (ceiling price) are better off. Sellers are not made better off since they are selling less and at a lower price.

10. Relating total fixed cost to average total cost , output, and firm size, it is clear that
    A. few firms can afford the larger fixed assets.
    B. larger fixed assets require that firms produce less.
    C. either small or large fixed assests will do the job equally well.
    D. purchasing a larger fixed asset can lower a firm's average total cost if output is sufficiently large.
    E. it is a good strategy to purchase a number of small-sized fixed assets.

11. Some cost items are referred to as variable cost because
    A. they vary from firm to firm in an industry.
    B. they vary from industry to industry.
    C. they vary from country to country.
    D. they vary depending on the production.
    E. they vary over time.

12. The relationship between the marginal cost and the total cost is, marginal cost is
    A. always greater than total cost.
    B. decreasing when the total cost curve's slope becomes very steep.
    C. the change in total cost resulting from a change in quantity produced.
    D. total cost divided by the level of output.
    E. always greater than average variable cost.

Determine whether each of the following statements TRUE or FALSE. In either case, briefly explain your reasoning. (3 points each)

TRUE/FALSE: The major reason for missing markets is the existence of non-marketable cost.

The major reason for a missing market is the lack of properly established property rights. It is correct that some costs are not easy to measure and integrate into the market but this is not the major reason.

TRUE/FALSE: If two commodities are substitutes, then an increase in the price of one commodity will lead to an increase in the quantity demanded for the other commodity.

As the price of a commodity increases, loyal customers do not change their demand for the commodity. The rest either stops consuming it all together or looks for an alternative. Therefore, the quantity demanded for a substitute commodity goes up.

TRUE/FALSE: In order to collect the highest revenue, it is better to tax commodities whose demands are not sensitive to price changes.

Imposing a tax increases the price and decreases the quantity consumed. To collect the highest tax revenue, it would be preferable to have as little a change in quantity consumed as possible. This happens when demand is not sensitive to price changes. The blue and red shaded areas show the tax revenue under each circumstance.
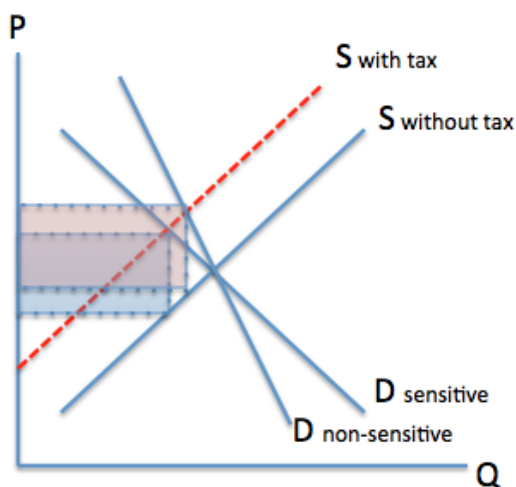

TRUE/FALSE: Rent Control is a price floor applied to rental housing market.

The purpose of rent control is to keep prices at a low level and to prevent them from going higher than a price ceiling.

TRUE/FALSE: Currently a small firm is producing 500 units at a price of $10 per unit where MC = $10/unit. Then, we can be sure that the firm is earning maximum positive profit it can.

The statement does not say anything about the ATC. If at the production level of 500, ATC is more than $10, then the firm is making a loss.
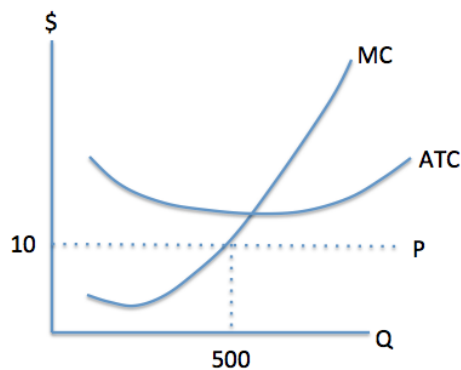
TRUE/FALSE: One of the reasons why JetBlue's profits are lower than its competitors is that JetBlue does not benefit from economies of scale as much as its competitors do.

In recent years, JetBlue's competitors got bigger via mergers and acquisitions. This enabled them to enjoy economies of scale.

TRUE/FALSE: It is not possible for ATC=AVC at any production level.

If the production of a commodity or a service does not require any fixed expenditure then all production depends on variable resources. Under these circumstances fixed costs would be zero. Then, ATC=AVC at every production level.

TRUE/FALSE: If producing one more unit makes ATC go from 16 to 10 then we can be sure that MC<ATC.

As can be seen from the following figure, as long as MC<ATC, ATC goes down. Once MC becomes greater than ATC, ATC starts to increase. Then, the statements is true.
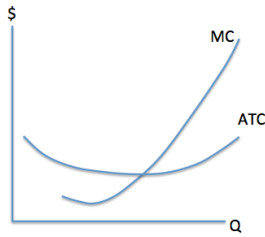
TRUE/**FALSE**: Profit per unit is the price minus average total cost for that unit. The quantity that maximizes profit per unit also maximizes the total profit.

As long as an extra unit brings in more revenue (P) than its cost (MC) production continues. This does not tell us anything about the per unit profit. In the following figure, the profit is maximized at Q* but the profit for the unit Q' is higher.
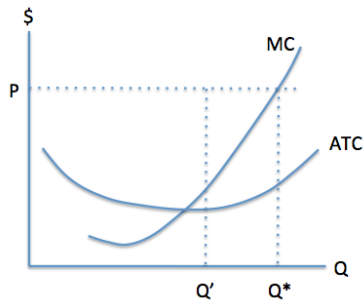
TRUE/FALSE: Internet has public good qualities not because of millions of tax dollars put towards its development but because consumption by one more person will not diminish the consumption by others.

A public good has two distinct characteristics: non-rivalry and non-excludability. As internet is consumed by one more person, its benefit to the rest of the consumers is not diminished.

TRUE/**FALSE**: Daimler Mercedes-Benz recently began production in a factory located in Hungary rather than in Germany. The main reason for this is the ongoing economic crisis in Western Europe and emerging middle class with a high demand in Eastern Europe.

The major reason for opening a factory in Hungary is the cheap and well-educated labor force. Therefore the decision relates to the cost side, not the demand side.

TRUE/FALSE: During the implementation of its Streetview Project, Google is benefiting from the existence of a missing market.

There is no well-established market for personal information and Google is collection personal information without paying for it.

TRUE/FALSE: Britain's imposing a price floor on the price of alcohol would create a deadweight loss.

When there is a price floor imposed, the price artificially becomes higher than market price. Then, some consumers who are willing to pay more than the cost it takes to produce the commodity are left out of the market. This is a deadweight loss.

TRUE/FALSE: A Verizon customer purchasing an iPhone today signs a contract to pay a fixed monthly amount for the coming two years. If, a year into the contract, interest rates rise, Verizon would be very happy to have locked in the customers early on at a fixed monthly payment.

The fixed monthly payment is what is owed to Verizon and it is calculated at a lower interest rate. Hence, when interest rates go up, Verizon will be getting a lower payment each month than it could have gotten elsewhere in the market.

TRUE/FALSE: A rational person would not choose to free ride on the benefits of a product if there existed a producer who offers that benefit at a reasonable price.

A rational person is a person who maximizes her benefits whenever she can. Then, if a benefit is offered by two sources, by one for free and by another at a "reasonable" price, a rational person would choose to get it for free.

Numeric Problems:

1. (4 points) How long will it take for an investment to triple at 4% APR if the compounding is done continuously?

$e^{0.04\,n} = 3$

$n = ln3/0.04$

$= 27.47$ *years.*

2. (4 points) In the above problem, if APR were to be 8% and compounding were to be done quarterly, would it take more or less time to triple the initial investment? By how many years?

$$\left(1 + \frac{0.08}{4}\right)^{4\,n} = 3$$

n = ln3 / 4ln(1.02) = 13.87 years, it would take 27.47-13.87 = 13.6 years less.

3. (7 points) Beginning a month from today, you will start to invest $1,000 each month. At some point, you would like to stop investing and start withdrawing $2,000 per month and still have $20,000 in your account right after your withdrawal 10 years from now. When can you start withdrawing money if APR is 12.06% and compounding is done monthly?
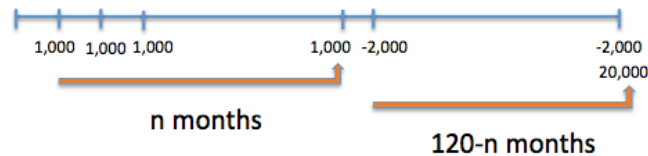
The future value of the cash stream from 1st through nth months should be equal to the present value of the cash stream from (n+1)st through 120th month.

$$1000 \frac{(1+i)^n - 1}{i} = 2000 \frac{(1+i)^{(120-n)} - 1}{(1+i)^{(120-n)}i} + \frac{20{,}000}{(1+i)^{(120-n)}}$$

dividing everywhere by 1000 and forming common denominator;

$$\frac{(1+i)^{(120-n)}[(1+i)^n - 1]}{(1+i)^{(120-n)}i} = 2\frac{(1+i)^{(120-n)} - 1}{(1+i)^{(120-n)}i} + \frac{20i}{i(1+i)^{(120-n)}}$$

getting rid of the denominators;

$$(1+i)^{120} - (1+i)^{(120-n)} = 2(1+i)^{(120-n)} - 2 + 20i$$

substituting for i=12.06/12=0.005;

$$1.005^{120} - (1.005)^{(120-n)} = 2(1.005)^{(120-n)} - 1.9$$

$$(1.005)^{(120-n)} = 1.24$$

120-n = ln(1.24)/ln(1.005) = 43.08, then, I can stop depositing money approximately a month after 3 and a half years and start withdrawing.

4. (6 points) You invested $1,000 with a bank today at APR 12% compounded annually and another $1,000 compounded monthly. What was your effective annual rate at the end of two years?

$$1000(1.12)^2 + 1000(1.01)^{24} = 2000\,(1+i)^2 \quad then \quad i=12.34\%$$

5. (5 points) A small company is producing 1,200 units per year. The costs will be incurred and the products can be sold at the end of each year. It is the beginning of year 1 today and the company's costs are expected to double every year beginning at the end of year 2. The price per unit is expected to stay constant. When will this business run out of money if the company can invest at APR 20% compounded annually. Cost today: $10/unit, Price today: $50/unit

End of year 1 = (50-10)*1,200= 48,000

End of year 2 = 48,000*(1.2)+(50-20)*1,200 = 93,600

End of year 3 = 93,600(1.2)+ (50-40)*1,200 = 124,320

End of year 4 = 124,320*(1.2) + (50-80)*1,200 = 113,184

End of year 5 = 113,184*(1.2) + (50-160)*1,200 = 3,820.8 – runs out of money

6. (5 points)A company must decide whether to buy Machine A or Machine B. At a 10% interest rate, which machine should be installed if it will be replaced when it wears out?

	Machine A	Machine B
Initial Cost	$10,000	$20,000
Useful Life in Years	4	10
End-of-life Salvage Value	$10,000	$10,000
Annual Maintenance	$1,000	0

Since the machines are going to be replaced, we can find the EAC for each machine and compare them:

Machine A: 10,000-10,000/(1.1)^4 +1,000[(1.1^4-1)/0.1(1.1)^4] = 6,340

EAC = 6,340 [0.1(1.1)^4/(1.1^4-1)] = 2,000

Machine B: 20,000-20,000/(1.1)^10 = 16,145

EAC = 16,145 [0.1(1.1)^10/(1.1^10-1)] = 2,626.77

Pick machine A.