Econ 101 Test #1 Practice

1. You inherit $200,000.
    a. If you invest this money in the stock market and earn 7% interest, what is your income from interest after one year? **(2 points)**

    b. The stock market is risky, so you invest half the money in the stock market and earn 7%, and half in treasury bonds that earn 3.5% annually. What is your income from interest after one year? **(2 points)**

    c. Generally speaking, do riskier investments have higher or lower interest rates? Why? **(1 point)**

2. American Airlines used to sell the AAirPass for $250,000, which granted you (free) first class tickets on any flight for life. Assume you have purchased such a pass at the age of 25. Recall that the formula for savings from annual contributions is:

$$\frac{c}{R/100}\left[\left(1+R/100\right)^{Y+1}-1\right]=B$$

a. Suppose you spend $10,000 per year on American Airlines first class plane tickets every year until the age of 75. What is the present discounted value of all these purchases, at the age of 25, if the interest rate is 3.5%? **(4 points)**

b. What is the intuitive interpretation for the present discounted value of all these purchases? **(2 points)**

c. Should you buy the AAirPass? Why or why not? **(1 point)**

3. Suppose 5 people have the following Willingness-To-Pay for a (single) horse:

Name	Willingness to Pay
Balon	$50
Drago	$200
Petyr	$500
Rob	$850
Tyrion	$1000

a. Construct and draw the aggregate demand curve for horses. Label the axes, and include units. **(2 points)**
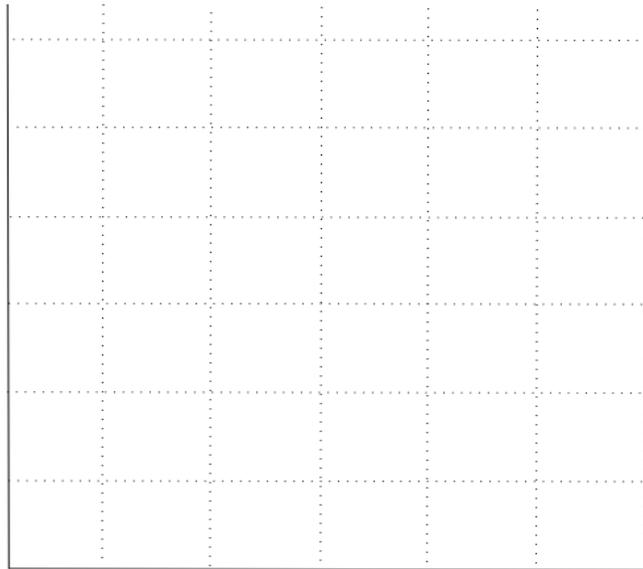
a. There are 3 horses for sale. If everyone pays the same, uniform price, what is the maximum price for which all three horses will be sold? **(1 point)**

b. Suppose a new person, Butch, comes into the market, with a willingness to pay of $650. Draw the new demand curve above with a dotted line. **(2 points)**

c. What is the maximum price for which three horses will be sold, after Butch enters? **(1 point)**

4. Suppose 3 people have the following individual demand curves for mobile data (measured in gigabytes per month):

Name	Individual Demand Curve
Martha	$X = 40 - 2P$
Marcy	$X = 80 - 4P$
Marlene	$X = 20 - P$

    a. Compute Martha's inverse demand curve **(2 points)**

    b. What is the aggregate demand curve? **(2 points)**

    c. How many gigabytes per month are sold, in total, if the price is \$10/gigabyte? **(1 point)**

5. In the United States, assume the daily demand for Pizza Hut Pizza (in millions) is given by
   $X = 8 - 0.7P$.
   a. How many pizzas does Pizza Hut sell at $10/pizza? **(1 point)**

   b. Pizza Hut decides to expand into India, with a population 4x as big as the United States. Pizza Hut assumes demand for their pizza will be 4 times US levels. If this is true, what is the (daily) demand curve for Pizza Hut pizza in India? **(2 points)**

   c. In fact, demand is only $X = 2 - P$ in India. What are two reasons why demand in India could be lower than in America, even though the population is bigger? **(2 points)**

6. Google is developing a self-driving car. Suppose the demand for such cars (in millions) is given by
   X = 150 − P/1000
   a. Draw this demand curve, labeling the axes and the intersection points. **(2 points)**

   b. Suppose Google succeeds in inventing a self-driving car and sells them for $100,000. Shade in the area corresponding to consumer surplus at this price, on the graph above. **(1 point)**

   c. What is consumer surplus at this price? **(2 points)**

   d. What interpretation can we give the consumer surplus? **(1 point)**

7. Consider the demand for apartments in Ames:
   a. If dormitories are a substitute for apartments, is the cross-price elasticity of demand between apartments and dorm rooms positive or negative? **(1 point)**

   b. Assume that the income elasticity of demand for apartments is 1.2. If the average income of students rises by 1%, how does demand for apartments change? **(1 point)**

   c. Suppose that when rent averages $500/month, 20,000 apartments are demanded. When the average rent falls to $400/month, demand rises by 5,000 apartments. What is the price elasticity of demand for apartments in Ames? **(3 point)**

8. Consider the following output table for an airplane manufacturing factory:

Fixed Inputs	Variable Inputs	Output (Planes)
" 1 Hanger, 10 cranes, 50 welders, etc…"	10 workers, 500 tonnes of metal	1
" "	15 workers, 1000 tonnes of metal	2
" "	25 workers, 1500 tonnes of metal	3
" "	50 workers, 2000 tonnes of metal	4

    a. Assume fixed inputs cost $10 million/yr. A worker costs $100,000/yr, and 500 tonnes of metal costs $1 million. Fill in the following table:

Output (Planes)	Total Cost ($million) **(2 points)**	Average Cost ($million) **(1 point)**	Marginal Cost ($million) **(2 points)**
1			-------------------------------
2			
3			
4			

9. Assume it is the 1950s and computers are the size of a room. The inverse demand for computers is given by P = 5 – X. Assume P is in measured in millions of dollars.

   a. What is the total revenue for selling 1, 2, 3, 4, and 5 computers? **(2 points)**

# of Computers	Total Revenue ($mn)	Total Cost ($mn)
1		1.5
2		6
3		13.5
4		24
5		37.5

   b. The total cost of producing computers is given above. In order to maximize profits, should the firm make 1, 2, 3, 4, or 5 computers? **(2 points)**

   c. Assume the marginal revenue curve is MR = 5 – 2X and the marginal cost curve is MC = 3X. Show how to find the profit-maximizing number of computers, using the marginal cost and marginal revenue approach. **(2 points)**