All Homework Questions, Econ 2302, Darren Grant.

This course has a total of six homework sets. Each homework set has six questions, which each have multiple parts. Please complete all parts of all questions, on a separate sheet of paper, and bring them to class on the assigned day to turn in. We will go over the answers together in class. Please note: no late work is accepted, even if you are just late to class. You are always welcome to turn in a hard copy of your work early, by sliding it under my office door. However, I do not accept work that is e-mailed.

To go over the homework, I will ask students to come to the board and write down the answers, as we work them out together as a class. Please be prepared to do so, and see me as soon as possible if you have questions or concerns.

Finally, our course Blackboard site has a “preview” video for each homework, in which I work out two problems entirely. These videos are always available, so you can use them to give you a “boost” in working out the problems or to see the answers later. Typically, in class we do not go through the problems that are featured on these videos.

Homework 1

1. Illustrate, for each situation, the effect of the “event” on price and quantity in the market specified, using a supply/demand graph.
   
   A) An decrease in income, on the market for gold.
   
   B) A cost-saving technology improvement, on the market for computers.
   
   C) A flood (of water), on the market for wheat.
   
   D) Summer (vacation time), on the market for gasoline.

2. Illustrate, for each situation, the effect of the “event” on price and quantity in the market specified, using a supply/demand graph.

   A) An increase in the price of electricity, on the market for steel.
   
   B) An increase in the price of mustard, on the market for grocery store hot dogs.
   
   C) An economic expansion, in the housing market.

   D) An increase in the minimum wage, in the market for fast-food.

3. True or False?

   A) A market can be perfectly competitive even if government places restrictions on it, such as a requirement that workers get paid extra for working overtime.

   B) In perfectly competitive markets, firms choose how much they will produce based on how much they think people will want to buy.
C) When prices go up, that must mean that people are buying more.

D) The perfectly competitive market always seeks the price that equates the amount supplied with the amount demanded, even if a higher price would give firms higher profits.

4. (Case and Fair, modified) The U.S. government administers two programs that affect the market for cigarettes. Media campaigns and labeling requirements are aimed at making the public aware of the health dangers of cigarettes. Meanwhile, the Department of Agriculture maintains a program which limits the amount of land that can be devoted to growing tobacco.

A) On a single supply/demand graph, demonstrate that these two programs are not at odds with respect to the goal of reducing cigarette consumption.

B) The cigarette market is not, in reality, a perfectly competitive market. Explain why.

5. (Mankiw, modified) Illustrate how each of the following events affect price and quantity in the market for minivans, using supply/demand graphs.

A) There is a baby boom.

B) Steel prices increase.

C) The price of SUVs rises.

D) Stock-market gains increase people’s wealth.

E) The minivan market cannot really be considered perfectly competitive market. Explain why.

6. When the World Cup comes to Qatar in 2022, people will need a place to stay. In the short run, is the supply of hotel rooms in Qatar is what we will soon call “inelastic.” This makes the supply curve relatively steep—not vertical, but close to vertical. Draw the curve this way in answering this question.

A) How will the arrival of the World Cup affect the price and quantity of hotel rooms in Qatar? Demonstrate on a supply/demand graph.

B) Should there be a greater increase in the price or quantity of Qatar hotel rooms during the Olympics?

Homework 2

1. Answer the following questions using the information in the table below (on the next page).

A) The demand curve assumes that all else, such as income, is being held constant. Draw the demand curve for an income of $500, and locate points A and C on the curve.

B) The demand curve shifts when income increases to $600. Draw the new curve and identify points B and D on the graph. Are sunglasses a normal good or an inferior good?
C) What is the elasticity of demand between points B and D? Is Kanye’s demand for sunglasses price elastic or price inelastic?

<table>
<thead>
<tr>
<th>Kanye West’s Demand for Sunglasses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Point</td>
</tr>
<tr>
<td>-------</td>
</tr>
<tr>
<td>A</td>
</tr>
<tr>
<td>B</td>
</tr>
<tr>
<td>C</td>
</tr>
<tr>
<td>D</td>
</tr>
</tbody>
</table>

2. The city decides to raise the amount it charges residents for water ($/thousand gallons) by 10%. They expected that revenues would also increase by 10%, but they only increased by about 5% instead.

A) What was the city assuming about demand, when it expected revenues to increase by 10%?

B) Is the demand for water elastic or inelastic?

C) Do you think profits from the waterworks went up by less than 5%, 5%, or more than 5%? Why?

3. Fir and spruce are two softwoods that are used for basically the same kinds of things—building furniture, Christmas trees, etc. Both are sold in competitive markets. A beetle infestation wipes out a lot of fir trees but leaves the spruce untouched.

A) Draw two supply/demand graphs to demonstrate how this would affect the prices and quantities sold of spruce and fir over the next few months.

B) Would the change in fir prices be greater if demand was elastic, or if it was inelastic?

C) Would you expect the demand for fir to be elastic or inelastic? Why?

4. (Mankiw, modified) Consider the federal minimum wage law, which sets a minimum wage that is above the equilibrium wage in the market for unskilled labor.

A) Using a supply/demand diagram, show the equilibrium wage, the minimum wage, the number of workers who are employed, and the number of workers who are unemployed.

B) Now suppose the Secretary of Labor proposes an increase in the minimum wage. What effect would this have on employment? Does the change in employment depend on the elasticity of demand, the elasticity of supply, or both elasticities?

C) For this same proposed increase in the minimum wage, what effect would this have on unemployment? Does the change in unemployment depend on the elasticity of demand, the elasticity of supply, or both elasticities?
5. Use the following information to answer these questions. Columns One and Two contain quantities (in arbitrary units).

<table>
<thead>
<tr>
<th>Price</th>
<th>Column One</th>
<th>Column Two</th>
</tr>
</thead>
<tbody>
<tr>
<td>$9</td>
<td>11</td>
<td>15</td>
</tr>
<tr>
<td>$8</td>
<td>12</td>
<td>14</td>
</tr>
<tr>
<td>$7</td>
<td>13</td>
<td>13</td>
</tr>
<tr>
<td>$6</td>
<td>14</td>
<td>12</td>
</tr>
<tr>
<td>$5</td>
<td>15</td>
<td>11</td>
</tr>
<tr>
<td>$4</td>
<td>16</td>
<td>10</td>
</tr>
</tbody>
</table>

A) Which column gives the demand relationship, and which gives the supply relationship?

B) What is the equilibrium price?

C) What price maximizes the revenue that is taken in by firms? To answer, calculate the revenue received at each price and see where it is largest.

D) At the price determined in part C), is there a surplus, a shortage, or equilibrium? How many units is the surplus or shortage, if there is one?

E) A price ________ (floor, ceiling) set at a price of $____ will lead to a shortage of 2 units.

6. There are 5,000 parking spaces on SHSU’s campus. Demand for parking spaces is higher during the day, when the lots are full, than at night, when you couldn’t fill up the parking lots if you wanted to. Day parking privileges are granted by buying a sticker, which costs $50 per semester; anyone can park at night.

A) Draw two demand curves for parking, one for daytime, one for night. Identify on your graph the number of parking spots on campus and the $50 price. Make sure your graph is consistent with the facts above, that the parking lots are full (but not overflowing) during the day, but could never be filled up at night.

B) If the price of parking stickers went down to say, $20 per semester instead of $50, what would it be likely out in the parking lots during the day; that is, what would be the consequences? Illustrate this on the graph you have drawn.

C) The university wants to increase revenue by raising the price of parking stickers to $60. Under what circumstances would that plan succeed, and when would it fail? Would you expect circumstances to be favorable or not? Why?
Homework 3

1. “Jordan and Friends” do Face Painting at the County Fair. It takes 10 minutes to paint a child’s face, and labor costs $12 / hr. (The cost of the paint is trivial and can be ignored.) At the fair, there is nonstop demand for Face Painting all day long, from 8 a.m. to 6 p.m. Only four workers & chairs can fit in the booth. Booth rental and setup costs a total of $500.

A) Would labor be considered a fixed cost or a variable cost? What about booth rental?

B) Draw out my “Model of a Firm,” and label each component of the model with its real-world counterpart for Jordan and Friends.

C) How many faces do Jordan and Friends produce in a day? What is the total cost of doing so?

D) Write out the right-angle model for Jordan and Friends. Numerically identify capacity, marginal cost, and the average total cost at capacity.

2. Robicheaux’s Green Acres is a fine family-owned and operated hotel located in the bayous of Louisiana. With one exception (see part A), the weekly costs of running the hotel are as follows:

Utilities: $1000   Wages (for the maids): $4000   Depreciation
Insurance: $1000   Value of the Family’s Time: $2000 and Maintenance: $500

During a typical week the hotel serves 200 guests (rooms) at a price of $50 per room.

A) I left out one major economic (opportunity) cost, that is not an accounting cost. What is it?

B) Calculate your accounting profit. Show your work.

Average total cost is $45 per room, while marginal cost is $35 per room.

C) A new guest walks in, and asks for a room. How much does it cost the Robicheaux Family to provide that guest a room for a night?
   1) $50
   2) $45
   3) $35
   4) that information hasn’t been given to me

D) Which of the costs listed above are not included (at all) in marginal costs?

3. The Americans with Disabilities Act, or ADA, requires public establishments to be accessible to the disabled. This requires the construction of concrete entrance ramps and other building improvements.

A) Are these building improvements fixed or variable costs?

B) How does the ADA affect firms’ MC curves? Draw, or illustrate, any changes.

C) How does it affect firms’ ATC curves? Draw, or illustrate, any changes.
4. The Law of Diminishing Returns applies to each of the following situations. Explain how. Identify in each case, the “output,” the “variable input,” and the “fixed factor.”

A) Trying to grow more soybeans by fertilizing more.

B) Scraping old paint off a wall.

C) Adding people to your team in tug-o-war.

5. Some Facts and Figures for “Blue Jean’s Auto Shop” are shown below. (Each is for a year period.) Jean could earn $25,000 painting houses if she didn’t work in her auto shop.

Revenues: $80,000 Jean’s initial investment: $100,000
Rent: $7,000 The interest rate: 6%
Car Parts: $15,000 Depreciation on machinery: $24,000

A) Draw out my “Model of a Firm,” and label each element as it applies to Blue Jean’s Auto Shop. Which costs are fixed and which are variable?

B) What are Jean’s accounting costs, and accounting profit?

C) What are her economic costs, and economic profit?

D) Based on your answers to the previous questions, how long will Blue Jean remain in the auto repair business? Choose one of the following answers, and explain why: 1) indefinitely, 2) she will exit in the long run, but remain in the short run, or 3) she will exit in the short run.

6. The following table pertains to a typical firm in a perfectly competitive market. The final product sells for a price of $18 per unit.

<table>
<thead>
<tr>
<th>Output</th>
<th>Total Cost</th>
<th>Marginal Cost</th>
<th>Average Total Cost</th>
<th>Total Revenue</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>10</td>
<td>---</td>
<td>---</td>
<td>----</td>
</tr>
<tr>
<td>1</td>
<td>19</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>28</td>
<td>9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>77</td>
<td>13</td>
<td>2.57</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>102</td>
<td>25</td>
<td>2.55</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>131</td>
<td>29</td>
<td>2.62</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>162</td>
<td>31</td>
<td>2.70</td>
<td></td>
</tr>
</tbody>
</table>

A) Fill in all of the empty cells in the table.

B) If the numbers in this table were drawn out on a graph, would the MC curve take the usual shape? What about the ATC curve? How do you know?

C) In this table, which output level maximizes revenue? Does this same output maximize profit?
Homework 4

1. Fluffy-Gro, Inc., grows cotton and sells it in a perfectly competitive market. Fluffy Gro worker Ima Doltt drives a new tractor into the Wetlands adjoining the property; a new tractor is purchased the next day for $20,000.

A) Is replacing this tractor a fixed cost, a variable cost, or both?

B) How is Fluffy-Gro’s MC curve (for this season) changed? If so, how?

C) Does Fluffy-Gro respond to the tractor incident by raising the price of its cotton?

D) Does Fluffy-Gro respond to the tractor incident by changing the quantity it produces? If so, how?

E) Why does Fluffy-Gro produce the quantity it does?
   1) It costs too much to produce any more.
   2) It can’t find buyers for any more cotton.
   3) It doesn’t want to lower its price to attract more buyers.

2. (Mankiw, modified) The fertilizer market is perfectly competitive. Firms in the market are currently operating, though they are earning a negative economic profit.

A) How does the price of fertilizer compare to the average total cost of making fertilizer?

B) Draw two graphs, side by side, illustrating the situation for the typical firm and for the market. The price axes on these two graphs should be on the same scale.

C) If there is no change in demand or costs going forward, what will happen over time to the price of fertilizer? Illustrate on the supply/demand graph.

D) Now how does the price of fertilizer compare to the average total cost of making fertilizer?

3. Calvin’s Barber Shop is a barber shop. It costs Calvin, in terms of time and electricity, $25 for each hour his shop is open. Calvin must have breakfast at 6 a.m. and be home for dinner at 7 pm, thus, the only hours he can work are 7 am – 6:59 pm. His hourly revenues depend on the time of day, as shown in the table below. The shop is busier during the peak of day than in early morning or in the evening.

<table>
<thead>
<tr>
<th>TIME (am)</th>
<th>7:00</th>
<th>8:00</th>
<th>9:00</th>
<th>10:00</th>
<th>11:00</th>
<th>12:00</th>
</tr>
</thead>
<tbody>
<tr>
<td>REVENUES</td>
<td>$15</td>
<td>$21</td>
<td>$33</td>
<td>$45</td>
<td>$50</td>
<td>$45</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TIME (pm)</th>
<th>1:00</th>
<th>2:00</th>
<th>3:00</th>
<th>4:00</th>
<th>5:00</th>
<th>6:00</th>
</tr>
</thead>
<tbody>
<tr>
<td>REVENUES</td>
<td>$40</td>
<td>$30</td>
<td>$23</td>
<td>$15</td>
<td>$10</td>
<td>$8</td>
</tr>
</tbody>
</table>

A) Do Calvin’s costs fit the right-angle model? What is his marginal cost of being open for an hour?

B) Should Calvin work from 7 am – 6:59 pm? What hours should Calvin’s Barber Shop be open?

C) Calvin’s rent is $100 per day. When Calvin’s lease expires, will he renew it? Why or why not?
4. Texas grows lots of citrus. Two graphs are drawn below. The one on the right contains the demand and short-run supply curves for the orange juice industry, assumed for this problem to be a perfectly competitive industry. The other contains the marginal cost curve for a typical firm in the orange juice industry. Currently, firms have no incentive to enter or leave the orange juice industry. (The price axes on the two graphs are on the same scale. The quantity axes need not be on the same scale, but that won't affect the problem.)

The curves you draw to answer the questions below should be as accurate as possible, and should be such that the two graphs are logically consistent with each other.

A) Draw in the average total cost curve for the firm.

B) Ellen DeGeneres begins advertising Texas Orange Juice on her TV show. Shortly afterwards we notice that the orange juice firm is producing at point Q*. What has happened to the demand for orange juice? Draw in the new curve.

C) If demand remains at this new, higher level, then what will happen to the price of orange juice over time? Illustrate on the graph.

5. (Case and Fair, modified) One way to increase the amount of housing available to low-income households is for the government to build it (public housing). An alternative is to provide households with vouchers that can be used like cash to rent housing supplied by private-sector landlords.

A) Illustrate the effect of each policy on the price and quantity of housing in the short run, using (separate) supply/demand curves.

B) In which case are private landlords better off? In which case are they worse off?
C) In the long run private landlords will enter profitable markets. Under which alternative (vouchers, government builds public housing) is this more likely to occur? On a separate supply/demand graph, illustrate the effect of entry on the price and quantity of rental housing in the long run.

6. The cost curves for Chopin’s Bedpans are given below. The market price of bedpans is $10.

A) QC = 500 bedpans. What are the firm’s total revenues, total costs, and total profits at QC?

B) QB = 350 bedpans. What are the firm’s total revenues, total costs, and total profits at QB?

C) At the current price of $10, does the firm make positive, zero, or negative economic profit at each of points QA-QC?

D) At which quantity does the firm make the most profit?

E) What will the price be in long run equilibrium?

F) How many bedpans (what quantity) will the firm produce in the long run?

Homework 5

1. In the hothouse working late one evening, Dr. Ima Masing discovers, to her surprise, the secret to growing the Bonsai Loblolly Pine Tree, which had eluded botanists for years. Dr. Masing can produce 10 Bonsai Pines in one hothouse in one year. Each hothouse costs her $2000 per year, and the cost of the labor, water, and fertilizer is $600 per tree.

A) Currently, what type of market is the Bonsai Pine industry?

B) Currently, Dr. Masing maximizes her profit by selling 50 trees per year at a price of $1000 each. What is her (yearly) profit?
C) Why doesn’t Dr. Masing produce 60 trees?
   1) The additional trees would be especially expensive to produce.
   2) She can’t find buyers for any more trees.
   3) She doesn’t want to lower her price to attract more buyers.

Then, suddenly, Dr. Masing’s lab assistant posts her Bonsai Pine growing secret on the Internet for all to read. Now anyone can grow a Bonsai Pine tree.

D) What type of market is the industry now?

E) What will the price (in $) of Bonsai trees be in the long run?

2. The demand curve and MC curve for Ft. Worth Cats games is shown below. The baseball stadium has 3,000 seats. The Cats play one game each week, and they keep all gate receipts.

   A) Why is MC so small?
   B) At what price does the stadium sell out?
   C) What price should the Cats charge? Illustrate on the graph.
   D) Do the Cats sell out the stadium or not? Why or why not?

3. The Bonsai is a miniature tree that takes skill and patience to grow. The cost of the seed, water, time, etc. to grow a Bonsai is $100. There are 11 people in Huntsville who are willing to buy the Bonsai tree for a price of $650 or less (but no more than $650). Everyone else in Huntsville does not want a Bonsai tree at any price.

   A) If Bonsai trees were sold in a perfectly competitive market, what would the price be (in the long run)?
   B) If Bonsai trees were sold by a single store in the area, what would their price be? What would the store’s profit be?

Now let there be a 12th person in town who is willing to buy a Bonsai tree for a price of $600 or less. Only one store in town sells Bonsai trees. The store doesn’t know who is willing to pay only $600; it just knows there are 11 people who would pay $650 and one who would pay $600.

   C) What is the marginal revenue from selling the 12th tree? What price will the store charge for Bonsai trees?

4. In most countries, including the United States, patent laws give developers of new pharmaceutical drugs the right to be the sole seller of that drug for a period of several years. Until recently, however, India’s patent policy essentially allowed anyone to produce any pharmaceutical drug, whether it was under patent in another country or not.
A) What type of market was the market for pharmaceuticals in India?

B) Draw a graph containing a marginal cost, and average total cost curves for a producer of a pharmaceutical drug. Identify the price in long run equilibrium in the Indian market.

C) What type of market is it for a drug under patent in the U.S.?

D) Copy over the cost curves you drew for part B onto a new graph, and add demand and marginal revenue curves to it. Identify the price of pharmaceuticals now.

E) In 2003, Indian companies were selling the leukemia drug Gleevec for $2,700 per year (enough doses for an individual to take for a year). After the change in patent policy, the patent-holder alone sold the drug and charged, instead, $27,000 per year. On the graphs you drew, where would the $2,700 and $27,000 go?

5. For each of the following markets, indicate whether it has barriers to entry, product heterogeneity, or a substantial degree of concentration. Then indicate whether or not it is perfectly competitive.

A) Domestic airline travel out of IAH.

B) Auto repair in Houston.

C) Auto towing in Houston.

D) Domestic train travel.

6. The following table provides the demand information for Leafy Green Tea. The marginal cost of producing each box of tea is $25, while the firm has fixed costs of $50.

<table>
<thead>
<tr>
<th>Units</th>
<th>Price</th>
<th>Revenue</th>
<th>Marg. Rev.</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$100</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>$80</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>$60</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>$40</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>$20</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

A) Fill out the table above.

B) If the firm’s goal is to maximize its revenue, how much should it produce?

C) If the firm’s goal is to maximize its profit, how much should it produce?

D) If the firm’s goal is to produce as much as possible without losing money, how much should it produce?
**Homework 6**

1. My friend says, "The restaurant industry is a perfectly competitive industry. Therefore, in the long run, all restaurants will earn a positive economic profit."

   A) Does this industry exhibit a lot of concentration? Is its product homogenous or heterogeneous? Are there barriers to entry? Overall, what is the market structure of the restaurant industry?

   B) Do restaurants have the power to set their own prices, or must they sell at a given “market price”?

   C) Do individual restaurants have the ability to earn an economic profit in the long run?

2. It costs more for a woman’s haircut than a man’s haircut, even in salons which offer both men’s and women’s cuts.

   A) If the haircutting market was perfectly competitive, and in long-run equilibrium, then what must explain the difference in the price of haircuts?

   B) If the haircutting market was not perfectly competitive, then differences in “product heterogeneity” could also explain the difference in the price of men’s and women’s haircuts. Explain how.

   C) Illustrate the point in part B) graphically. Do this by drawing two graphs for haircuts, one for men, one for women. Make the cost curves on these graphs identical, but let there be different degrees of product heterogeneity. Identify the profit maximizing price in both graphs, and compare them.

   D) Is the haircutting market perfect competitive or monopolistically competitive? Why?

3. A university is considering auctioning licenses that would allow vendors to sell canned soft drinks on campus. It is trying to decide between having one vendor or two vendors.

   A) If the university allows two vendors, will the price be higher or lower than if it had one vendor? What about the quantity?

   B) If the university sells licenses to two vendors, will it receive more in total license fees than if it sells a license to only one vendor?

   C) Will students be better off if the university licenses one vendor or two? Explain.

   D) In which situation, one vendor or two, does the market have greater concentration?

4. Five behaviors that are sometimes observed in markets are the following:

   - Firms cannot choose their price
   - Price exceeds marginal cost
   - Firms would generally like to have more customers
   - In the long run, firms produce the amount that minimizes ATC
   - Barriers to entry make it difficult for new firms to enter the market

   A) Which of these behaviors would typically be observed in a perfectly competitive market?
B) Which of these behaviors would typically be observed in a monopoly?

C) Which of these behaviors would typically be observed in monopolistic competition?

5. A cost-curve graph is given below for a typical firm in a monopolistically competitive industry.

A) Identify the profit maximizing quantity and price on the graph; label them Q_1 and P_1.

B) Is this firm currently making economic profit?

C) This market is not in long run equilibrium. Why not?

D) If the market were perfectly competitive (it’s not), then what price would prevail in the long run? Label this P_2.

E) Which price will prevail in the long run in this market: P_1, P_2, or a price between P_1 and P_2?

6. The table below relates market events to price, quantity, and profits. Fill in the blank cells.

<table>
<thead>
<tr>
<th>Market Change</th>
<th>Effect on Price</th>
<th>Effect on Quantity</th>
<th>Effect on Profit</th>
</tr>
</thead>
<tbody>
<tr>
<td>exit from the market</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>consumers’ brand preferences become stronger</td>
<td>xxxxxx</td>
<td>xxxxxx</td>
<td></td>
</tr>
<tr>
<td>costs increase</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>an increase in concentration</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>increase</td>
<td>increase</td>
<td>increase</td>
<td>increase</td>
</tr>
</tbody>
</table>
The Cost of Driving Assignment. You can work this assignment, applied to your own car, and turn it in before the day listed on the syllabus to make up for a missed homework or Blackboard quiz. To receive credit, you must type your work and show all calculations.

In this problem we will estimate the economic costs of driving for your car (if possible). The Web site edmunds.com contains a “Used Car Appraiser” that gives values for used cars that aren’t too rare or too old. (It takes a little hunting to find it.) Pick a car, yours if possible, that meets these three criteria: 1) it’s on the used car section of the Web site, 2) it must not be the first year of the model, and 3) the same model, one year older, must also be on the used car section of the Web site.

Write down your annual insurance cost, annual mileage, gas mileage, typical annual maintenance costs for a car your age and type, the current price of the gas that you put in your car, the replacement value (retail) of your car, the value of the same car one year older with the same mileage, and the value of the same car one year older with an additional year’s mileage. These last three come from the web site—you’ll have to use the used car vehicle appraiser.

Using the information you have just written down, complete the following.

A) Calculate the per mile cost of gas.

B) Calculate the per mile maintenance cost.

C) Calculate the average cost per mile of insurance.

D) Calculate the “opportunity cost of capital,” that is, the interest paid (or foregone) on the money you have currently invested in the car, for one year. You can probably find an interest rate on the web site or you can make up your own (reasonable) interest rate.

E) Calculate the average interest cost per mile.

F) Calculate total depreciation on the car as the difference between the retail value of the car and the value of the same car one year older with an extra year’s mileage.

G) Calculate age depreciation as the difference between the value of the car and the value of the same car one year older with the same mileage.

H) Calculate use depreciation as the difference between total depreciation and age depreciation.

I) Calculate the average depreciation cost per mile.

J) Calculate the marginal depreciation cost—the amount the car depreciates for each mile it is driven.

K) Classify each of the following costs as either fixed or variable: gas, maintenance, insurance, interest, age depreciation, and use depreciation.

L) Calculate the average costs of driving the car, per mile. Use (some of) your results in a)-j).

M) Calculate the marginal costs of driving the car, per mile. Use (some of) your results in a)-j).

N) The State of Texas reimburses mileage for private cars driven on state business at 55¢ per mile. If no one else needed to use your car, and you needed to travel on state business, should you drive your own car or take a state car of the same level of quality, safety, and comfort? What about if the reimbursement rate was 25¢ per mile?

O) An analog here to “increasing output with existing capacity” would be driving faster. We know that the law of diminishing returns applies whenever a firm tries to increase output by using more of a variable input with its existing capacity. In the current situation, what is the fixed factor? The variable input? The output? How does driving faster exhibit diminishing returns?