**Homework Week 1**

**EGR 310**

**5/1/23**

**Problem 1 (10 points)**

Select the correct economic criterion (maximize profit, minimize cost, maximize benefit) for each of the following scenarios and briefly explain why: *(Chapter 1)*

* 1. A community collected $200,000 to put on a 4th of July fair, parade and fireworks show. What is the economic criterion for organizers?

***Enter your answer here:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_***

* 1. A restaurant has found that spending on flyer advertising through the mail increases sales but at a decreasing rate as the number of flyers increase. What are the economic criteria for the restaurant?

***Enter your answer here:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_***

* 1. A services contractor received a fixed price contract to install and maintain IT equipment for the county of San Diego. What are the economic criteria for the services contractor?

***Enter tour answer here:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_***

**Problem 2 (10 points)**

Why is step 9 of the decision-making process, audit the results, important? Why do you think firms often ignore this step? *(Chapter 1)*

 ***Enter your answer here:***

FYI Steps in the Ethical Decision Process

1.Recognize the problem

2.Define the goal or objective

3.Assemble the relevant data

4.Identify feasible alternatives

5.Select the criterion to determine the best alternative

6.Construct a model

7.Predict each alternative’s outcomes or consequences

8. Choose the best alternative

9. Audit the results

**Problem 3 (10 points)**

A bagel shop has fixed costs of $200 per day and variable costs 10 cents per bagel.

a)How many bagels must be sold at 50 cents each to break even?

b) To make $100 in one day?

c)To make $200 in one day? *(Chapter 2)*

***Profit = total revenue - total cost***

***Breakeven -> profit = 0***

***a)Enter your answer here: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_***

***b)Enter your answer here:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_***

***c)Enter your answer here:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_***

Excel has the function called Goal-seek that is very helpful. After a model is created you can very easily conduct the “What-if” analyses.

**Problem 4 (10 points)**

 A manufacturing plant that makes boomerangs has a fixed cost of $500/day and a variable cost of $40/hr for labor for the first 8 hours of production and $60/hr for each hour of production over 8 hours. Assume that the laborers are sent home after completing the required output and paid only for hours worked. If the output of boomerangs (production) is 75 units/hr, what are the marginal and average costs per boomerang for producing: *(Chapter 2)*

To produce 450 boomerangs –

***450/75 = \_\_\_\_\_ hrs labor***

***Avg = (6\*$40 + $500)/450 = \_\_\_\_\_ / boomerang.***

***Marginal = $40/75 = \_\_\_\_\_/ boomerang***

To produce 525 boomerangs

***525/75 = \_\_\_\_\_hrs labor***

***Avg = (7\*$40 + $500)/525 = \_\_\_\_\_\_/ boomerang.***

***Marginal = $40/75 =\_\_\_\_\_\_\_ / boomerang***

To produce 675 boomerangs

***675/75 = \_\_\_\_\_\_ hrs labor (8 @ $40/hr and 1 @ $60/hr)***

***Avg = (8\*$40 + 1\*$60 + $500)/675 = \_\_\_\_\_ / boomerang.***

***Marginal = $60/75 = \_\_\_\_\_\_/ boomerang***

To produce 750 boomerangs

***750/75 = \_\_\_\_\_ hrs labor (8 @ $40/hr and 2 @ $60/hr)***

***Avg = (8\*$40 + 2\*$60 + $500)/750 = \_\_\_\_\_\_ / boomerang.***

***Marginal = $60/75 = $0.80 / boomerang***

A Marginal Cost is a variable cost of producing one more unit.

The Average Cost is the total cost divided by the number of units.

**Problem 5 (10 points)**

A company plans to design and build transport vehicles for the Army.

The cost for the design is $10M.

The cost for the test prototype is $2M.

The cost to produce and test each production vehicle is $0.5M.

A) What is the non-recurring cost per vehicle?

B) What is the recurring cost per vehicle?

C) What price per vehicle must the company sell 50 vehicles to the government to make $50K profit per vehicle:

***Ans A) Non-recurring costs =\_\_\_\_\_\_\_\_+***

***Ans. B) Recurring cost =\_\_\_\_\_\_\_\_\_/vehicle***

***Ans. C) Price per vehicle to make 50k profit per vehicle when company sells 50 vehicles:***

***$50K\*(50) = SP50(50) – ($12M - $500K\*(50))***

***$2.5M = SP50 \*(50) - $12M - $25M***

***Sp of 50\*(50) =$2.5M+$12M+$25M =\_\_\_\_\_\_\_\_$***

**Problem 6 (10 points)**

You own an apartment complex with 85-bedroom units.

Each unit rents for $1250/mo.

Annual costs to operate the complex is $1M

If the vacancy rate is 5%, what profit do you get per year? *(Chapter 2)*

***85 \* (.95) \* $1,250/mo. \* 12mo – $1,000,000 = $\_\_\_\_\_\_\_\_\_\_\_\_***

**Problem 7 (10 points)**

Draw a 5-year cash flow diagram representing the following cash flows to build springs:

*(Chapter 2)*

a) Initial investment in plant and equipment $50K

b)Annual maintenance: $3K after year 1 and increasing $1K per year after that

c)Annual production costs – $10K/year

d) Annual revenue - $25K/year

Step 1: Complete the table as shown below:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **YR** | **Initial Investment** | **Annual Maint** | **Annual Prod Costs** | **Annual Revenue** | **Total** |
| 0 |  |  |  |  |  |
| 1 |  |  |  |  |  |
| 2 |  |  |  |  |  |
| 3 |   |  |  |  |  |
| 4 |   |  |  |  |  |
| 5 |   |  |  |  |  |

**Problem 8 (10 points)**

Label each of the following as sunk cost, opportunity cost, or incremental costs: *(Chapter 2)*

You are deciding which car to buy. Car A is $24,000 and car B is $32,000. The difference in price is $8,000. What kind of cost does this represent?

***Enter your answer here:\_\_\_\_\_\_\_\_\_\_\_\_***

Your company invested $300,000 into a study to determine the feasibility of introducing a new product line into the business. The study recommended 2 mutually exclusive feasible alternatives. What kind of cost does the $300K represent?

***Enter your answer here:\_\_\_\_\_\_\_\_\_\_\_\_***

You have 2 alternatives for a $10,000 investment. Investment A provides a $500 return and investment B provides a $700 return. If you choose Alternative B, what does the $500 return from Alternative A represent?

***Enter your answer here:\_\_\_\_\_\_\_\_\_\_\_\_***

**Incremental Costs***:* It is the delta between the outcomes of two mutually exclusive alternatives.

**Sunk Costs***:* A Sunk cost is the money already spent as a part of the decision. Sunk costs must be ignored in engineering decisions because current decisions cannot change the past.

**Opportunity Costs***:* using resources in one activity instead of another.