Name: ________________________________

UIN: ________________________________

Class time: (please circle)  11:10am to 12:25pm  or  12:45pm to 2:00pm

Instructions:

1. Please provide your name and UIN.

2. Circle the correct class time.

3. To get full credit on answers for this exam, be clear, rigorous, and thorough in your responses.

4. You cannot get credit (full or partial) unless something is written.

5. Sign the Aggie Pledge.

   “On my honor, as an Aggie, I have neither given nor received unauthorized aid on this academic work.”

_______________________________    _____________________
Signature                        Date
(21pts) 1. Concepts

(a) Suppose that the Dow Chemical Company anticipated that profits over the next three years to be as follows:

<table>
<thead>
<tr>
<th>Year</th>
<th>Expected Profits (Millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>$10,180</td>
</tr>
<tr>
<td>2013</td>
<td>$11,250</td>
</tr>
<tr>
<td>2014</td>
<td>$15,775</td>
</tr>
</tbody>
</table>

Calculate the value of the Dow Chemical Company today. Assume the discount rate to be three percent.

(b) What is the relationship, if any, between the discount rate and the computation of the value of the firm?

(c) True or False. Given the utility function, \( U = \sqrt{y} \), the marginal utility of income is constant. Note that \( y \) corresponds to income. Provide evidence to support your answer.

(d) True or False. Let \( U = 4y^3 + 2y^2 \) denote the utility function of a key decision-maker. This decision-maker is a risk taker. Provide evidence to support your answer.

(e) (i) A certainty equivalent factor \( \alpha < 1 \) implies what type of risk attitude?

(ii) A certainty equivalent factor \( \alpha = 1 \) implies what type of risk attitude?

(f) The expected value in dollar terms of a risky project is $500,000. The certainty equivalent adjustment factor (\( \alpha \)) is equal to 0.8. What is the certainty equivalent of this project?
(2pts) (g) A minor league baseball team is trying to predict ticket sales for the upcoming season and is considering changing ticket prices. The elasticity of ticket sales with respect to the size of the local population is estimated to be 0.7. If the local population increases from 60,000 to 61,500, what is the predicted change in ticket sales? Please give your answer in terms of percentage change.

(1pt) (h) __________________ is defined as the situation where all possible outcomes of managerial decisions and their probabilities are not completely known. (Fill in the blank.)

(1pt) (i) If a decision-maker is risk neutral, then the risk premium is ____________________________. (Fill in the blank.)

(1pt) (j) If a decision-maker is risk loving, then the risk premium is ____________________________. (Fill in the blank.)

(1pt) (k) What is the distinguishing feature between the notion of business profit and the concept of economic profit?

(1pt) (l) The economist associated with the topic of risk analysis is _____________________.

(2pts) (m) Suppose an individual’s utility function is related to income. Denote this utility as $U(y)$. It is known that $U(50) = 10$, $U(100) = 15$, and $U(150) = 18$. Does this person have a decreasing, constant, or increasing marginal utility of income? Circle the correct answer. Show all work.
2. Information concerning the financial situation for the Coca-Cola Company in 2010 is given as follows:

<table>
<thead>
<tr>
<th>Sales Revenue ($ million)</th>
<th>Net Income ($ million)</th>
<th>Net Worth($ million)</th>
</tr>
</thead>
<tbody>
<tr>
<td>26,193</td>
<td>6,172</td>
<td>15,143</td>
</tr>
</tbody>
</table>

(2pts) (a) Calculate the profit margin for the Coca-Cola Company.

(2pts) (b) Calculate the return on equity for the Coca-Cola Company. Interpret this answer.

3. Suppose that for Timely Products, Inc., the total cost function (TC) is given by

\[ TC = 15Q - 0.6Q^2 + 0.05Q^3 \]

where Q corresponds to the level of output produced by Timely Products, Inc.

(1pt) (a) What is the marginal cost (MC) function of the firm?

(1pt) (b) What is the average total cost (ATC) function of the firm?

(2pts) (c) What is the breakeven price for Timely Products, Inc.?
(10pts) 4. Nothing But Coffee, Inc., recently introduced a unique new coffee maker to handle the use of whole beans. Monthly demand and cost relations for the company’s coffee maker are as follows:

\[
P = 120 - 0.5Q \\
TC = 420 + 60Q + Q^2
\]

(5pts) (a) Derive the expression for profit for Nothing But Coffee, Inc. Express your answer in terms of Q.

(3pts) (b) What value of Q maximizes profit for Nothing But Coffee, Inc.? Please indicate the first-order and second-order conditions to substantiate your answer.

(1pt) (c) What price should Nothing But Coffee, Inc. charge in order to maximize profit?

(1pt) (d) What is the maximum level of profit that Nothing But Coffee, Inc. may earn?
5. Suppose that the demand and supply curves for a lumber/forest product are given as follows:

\[ Q_d = 80 - 30P \]
\[ Q_s = -20 + 20P \]

(Q_d and Q_s are measured in thousands of board feet and P is price in dollars.)

(a) What is the minimum price for which quantity demanded is zero?

(b) Find the market equilibrium price (P) and quantity (Q).

(c) When the price is $2.25 does a surplus or shortage exist?

(d) What is the level of excess demand or excess supply when the price is $2.25?

(e) What is the elasticity of demand and supply at the equilibrium price?

\[ \text{elasticity of demand} \]
\[ \text{elasticity of supply} \]

(f) Derive the inverse demand curve.
(16pts) 6. The demand for the Coca-Cola product Dasani (bottled water) is given as:

\[ Q_D = 0.75 P_D^{-0.7} P_{AQF}^{0.4} P_{PL}^{0.5} P_{TEA}^{-0.6} I^{0.3} A^{0.1}, \]

where \( Q \) denotes the quantity of Coca-Cola Dasani sold, \( P_D \) denotes the price of Dasani, \( P_{AQF} \) denotes the price of AquaFina, \( P_{PL} \) represents the price of private label brands of bottled water, \( P_{TEA} \) represents the price of tea, \( I \) represents U.S. disposable income, and \( A \) represents the level of advertising expenditures associated with the Dasani product.

(a) What is the technical name of this type of demand function?

(b) True or False. A price reduction for Dasani bottled water, all other factors invariant, will increase the number of units sold and sales revenue. Provide evidence to support your answer.

(c) If Pepsi raises the price of AquaFina by 6 percent, then the quantity of Dasani sold rises by ________________ percent, all other factors invariant. Show all work.

(d) Tea and Dasani bottled water are ________________. Provide evidence to support your answer.

(e) True or False. The chief competitor of Dasani bottled water is private label brands of bottled water. Provide evidence to support your answer.

(f) Consider the following scenario. The price of Dasani bottled water rises by 3 percent, the price of private label brands falls by 2 percent, income falls by 5 percent, and advertising expenditures increases by 4 percent. What is the net effect on the quantity of Dasani bottled water sold?

(g) True or False. If we center attention on income, how would Dasani bottled water be classified? Provide evidence to support your answer.

(h) List two additional factors, besides those that have been given, that would potentially affect the demand for Dasani bottled water.
Johnny Rockets is a retro 1950s hamburger restaurant chain. The company has a limited amount of capital for expansion and must carefully weigh available alternatives. Currently the company is considering opening additional restaurants in Las Vegas, Nevada or Dallas, Texas. Weekly profit projections for these two potential outlets under two possible scenarios related to the economy and their probabilities are given as follows:

<table>
<thead>
<tr>
<th>City</th>
<th>Scenario (State of Nature)</th>
<th>Annual Profit Contribution</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dallas</td>
<td>Recession</td>
<td>$2,500</td>
<td>.4</td>
</tr>
<tr>
<td>Dallas</td>
<td>Status Quo</td>
<td>$3,000</td>
<td>.6</td>
</tr>
<tr>
<td>Las Vegas</td>
<td>Recession</td>
<td>$2,000</td>
<td>.7</td>
</tr>
<tr>
<td>Las Vegas</td>
<td>Status Quo</td>
<td>$4,000</td>
<td>.3</td>
</tr>
</tbody>
</table>

(a) Calculate expected value of profit for Dallas and Las Vegas. Which is the more attractive location?

(b) Calculate the standard deviation of profit for Dallas and Las Vegas. Which is the more attractive location?

(c) Calculate the coefficient of variation of profit for Dallas and Las Vegas?
8. John Deere, Inc. considers profit scenarios for the next fiscal year.

<table>
<thead>
<tr>
<th>Business Conditions</th>
<th>Profit</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent</td>
<td>$300,000</td>
<td>0.1</td>
</tr>
<tr>
<td>Conventional (Typical)</td>
<td>$175,000</td>
<td>0.6</td>
</tr>
<tr>
<td>Abysmal</td>
<td>$ 60,000</td>
<td>0.3</td>
</tr>
</tbody>
</table>

(a) Calculate the expected value of profit for John Deere, Inc. for the next fiscal year.

(b) Suppose the utility function for the CFO (Chief Financial Officer) is given by \( U = \ln \pi \), where \( \pi \) corresponds to profit.

(i) Calculate the MU of profit for this decision-maker.

(ii) Is the CFO a risk taker, risk averter, or neutral to risk?

(c) Calculate the expected value of utility for the CFO when \( U = \ln \pi \). Show all work.

(d) What is the risk premium when \( U = \ln \pi \). Show all work.
(10pts) 9. Suppose two projects offer the following payoff matrix:

<table>
<thead>
<tr>
<th>State of Nature</th>
<th>Probability</th>
<th>Project A</th>
<th>Project B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Status quo</td>
<td>0.60</td>
<td>$1,000</td>
<td>$200</td>
</tr>
<tr>
<td>Recession</td>
<td>0.25</td>
<td>-$300</td>
<td>$20</td>
</tr>
<tr>
<td>Boom</td>
<td>0.15</td>
<td>$2,000</td>
<td>$1,500</td>
</tr>
</tbody>
</table>

(2pts) (a) Which project should one choose if a maximin decision rule is used?

(6pts) (b) Which project should one choose if a minimax regret decision rule is used? Your answer must provide the opportunity loss or regret matrix.

(2pts) (c) Suppose that probabilities of status quo, recession, and boom change to 0.50, 0.30, and 0.20 respectively. Do your answers given in (a) and (b) change? If so, how?