To receive full credit, you must explain your answers fully and show all work. PLEASE ANSWER ANY THREE QUESTIONS.

1. ANSWER ONE OF A AND B.

A. The following statement is attributed to a St. Thomas Economics major.

“If prices go up by more than my income, I am worse off. If my income goes up by more than prices, I am better off.”

Use the weak axiom of revealed preference and concepts of Paasche and Laspeyres price indexes to evaluate carefully the student’s statement.

B.

i) State the weak axiom of revealed preference the strong axiom of revealed preference. (10 points)

ii) On four occasions a consumer’s buying behavior was observed. The prices and choices for the four observations are summarized in the following table.

<table>
<thead>
<tr>
<th>Observation</th>
<th>( p_1 )</th>
<th>( p_2 )</th>
<th>( x_1 )</th>
<th>( x_2 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>4</td>
<td>4</td>
<td>3</td>
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<td>2.</td>
<td>5</td>
<td>2</td>
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<td>3</td>
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<tr>
<td>3.</td>
<td>1</td>
<td>10</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>4.</td>
<td>6</td>
<td>2</td>
<td>3</td>
<td>4</td>
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</tbody>
</table>

Find any and all revealed preference statements that can be made based on these observations. Are these choices consistent with the weak axiom of revealed preference? Explain. (23 points)

2. Draw a diagram showing the substitution and income effects for a decrease in the price of a good. Assume this good (i.e., the good for which the price decreases) is normal and the other good is inferior. Label everything in the diagram and explain how the substitution and income effects are obtained.
3. Consider a person in a two-good world who derives income only from the market value of her initial endowments of the two goods. Draw a diagram showing the substitution effect, ordinary income effect and endowment income effect of an increase in the price of one of the goods. Assume the good for which the price increases is inferior and that the other good is normal. Assume the person is a net seller of the good for which the price increases. Label everything in sight and carefully explain what is being depicted in your diagram.

4. Beldar is a native of the planet Dork. Dorks derive satisfaction from only two sources: leisure and consumption of mass quantities. (One mass quantity is defined as one case of Budweiser and one box of potato chips.) Mass quantities sell for $25.00 per unit and the leisure time of a Dork can be sold for $10.00 per hour. (Dork days are the same length as Earth Days – 24 hours.) Dorks can derive income only from selling their leisure time. Dorks are peculiar in that leisure is always an inferior good and mass quantities are always normal. Other than this peccadillo, the preferences of Dorks are well-behaved in the sense that they satisfy the usual assumptions (i.e., they are complete, reflexive, transitive, monotonic and strictly convex.)

(a) Draw a diagram showing the equilibrium for Beldar. Label all axes and curves.

(b) Draw a diagram showing how the situation would change if Dorks could sell their leisure for $20.00 per hour.

(c) Given the above assumptions about Dork preferences, could Beldar’s labor supply curve bend back on itself? Explain.

(d) Mork, the supreme ruler of Dork, has an idea to improve the well being of Dorks. He wants to give each citizen of Dork a gift of mass quantities. The amount of mass quantities given would be equal to the equilibrium amount consumed in the previous period. Mork’s advisors are concerned that Dorks will become lazy and work fewer hours per day. Show graphically and explain verbally whether this concern is justified.

5. Use the model of intertemporal consumer choice to evaluate carefully the following statements.

(a) A decrease in the inflation rate will always induce rational savers to save more. (7 points)

(b) A decrease in the interest rate cannot cause a rational saver to become a borrower. (9 points)

(c) A rational borrower cannot be made better off by an increase in the interest rate. (9 points)

(d) If future income falls and current consumption is an inferior good, a rational saver will save more. (8 points)
6. Financial economic models often assume that arbitrage activity will insure that, after adjusting for risk and tax treatment of returns, all assets will provide the same rate of return. Assuming there is a risk free financial asset providing a constant annual yield of \( r = 0.05 \), apply the arbitrage principle to the following situations.

(a) There is a fixed amount of petroleum that can be replaced with a perfect substitute source of energy in ten years. One unit of the alternative energy source will cost $200 in ten years. Derive the formula(s) that give the price of petroleum in each of the next ten years. (11 points)

(b) There is a tree that contains \( F(t) = e^{0.1t - 0.001t^2} \) units of lumber at time \( t \). Assuming the price of lumber is constant, determine the optimal time for cutting the tree. (Note: This part uses calculus.) (11 points)

(c) Please evaluate the following statement. (11 points)

“I hate collecting stamps, but I do it because investing in collectibles is the best way to get a rate of return greater than the risk free rate of five percent.”

7. Use the weak axiom of revealed preference and the indifference curve – budget line model with initial endowments (i.e., the “buying and selling” model presented in chapter 9) to evaluate each of the following statements.

(a) If you are a net seller of a good and the price of the good increases you must remain a net seller of the good. (8 points)

(b) If you are a net seller of a good and the price of the good falls you must remain a net seller of the good. (9 points)

(c) A net buyer of a good can be made better off by an increase in the price of the good, but only if the price increase induces the person to become a net seller of the good. (9 points)

(d) If you are a net seller of a normal good and your endowment of that good increases, you will continue to be a net seller of that good. (7 points)