

1. You are going to the movie theatre to watch a movie and have the following utility function over popcorn (P) and soda (S): $U(P, S) = \min \{2P, S\}$. After buying a ticket, you have \$12 left for snacks. Popcorn costs \$6 and soda costs \$3.
 - a.) Write the budget constraint and draw it on the graph. Label the axis and the intercepts.
 - b.) Solve for the optimal amount of popcorn and soda that maximizes your utility.
 - c.) What utility level is achieved from the optimal amount of popcorn and soda? Draw the indifference curve on the graph.
 - d.) Due to supply chain issues, the price of soda increases to \$5. What are the new optimal amounts of popcorn and soda? What utility level is achieved with this price change?
 - e.) When the price of soda is \$5, how much money would you need to spend to attain the same utility?
 - f.) Explain intuitively why your utility level increased/decreased/stayed the same.
2. **Short Answer:** In one or two sentences, answer the following questions.
 - a.) What does it mean to be a normal good vs and inferior good?
 - b.) What does it mean to be an ordinary good vs Giffen good?
3. Find the optimal consumption bundles for the following utility functions. Assume you have the same budget for all scenarios: $2X + 6Y = 36$.
 - a.) $U(X, Y) = 4X^{.5} + 2Y$
 - b.) $U(X, Y) = 4X^{.5}Y$
 - c.) $U(X, Y) = 2X + 4Y$