1) Suppose the price of good X rises. However, at the same time, the consumer is given more income so that the consumer can buy exactly the original bundle.

a) Graphically diagram the consumer’s response. (5 points)

b) How will the consumer’s marginal rate of substitution (of good y for good x) change? (5 points)
2) You are given the following information regarding demand for two goods “Snappers” and “Twibs”:

Income elasticity of demand for Snappers = -0.4
Cross-price elasticity of demand for Twibs with respect to the price of Snappers = 1.2

a) How would you describe the relationship between Snappers and Twibs? (5 points)

b) If the price of Snappers increased, what would happen to the demand for Snappers? What would happen to the demand for Twibs? Explain in detail. (5 points)
c) Using your answer to part b, how would these changes in demand affect the market price of Twibs? State all assumptions. (5 points)

3) Commuters have two ways to travel to work: by train and by automobile. Thus, train travel and gasoline are substitute goods. You are given the following supply and demand curves for gasoline:

Supply: \[ Q = -20 + 2P_G \]
Demand: \[ Q = 60 - 4P_G + 25P_T \]

where \( P_G \) = price of gasoline per gallon, and \( P_T \) = price per mile of train travel. Currently, the price of train travel is $4 per mile.

a) Graph the demand and supply of gasoline. (4 points)
b) Compute the equilibrium price and quantity of gasoline. (Hint: the correct answer is not a very “realistic” price). (7 points)

c) At this equilibrium point, compute the arc price elasticity of demand for gasoline. (hint: there is more than one reasonable way to do this – if you get stuck, show me how you would set-up the problem). (7 points)

d) Compute the amount of consumer surplus received by consumption of gasoline. (7 points)
e) Suppose the government imposed a price ceiling on gasoline of $20. How many gallons of gasoline would be sold? Would there be a shortage or surplus of gasoline? (5 points)

f) After the price ceiling is imposed. Compute the new consumer surplus received by consumption of gasoline. (If you have trouble with this calculation, show the new CS on a graph). (5 points)

g) Suppose instead of the price ceiling, the government decided to subsidize train travelers. How would this affect the price of gasoline? Explain in detail. (5 points)
4) Cindy has an income of $1000. The price of rental units in the area is $25 per square foot.

a) Write an equation for Cindy’s budget constraint for Square Footage and Other Goods (assume the price of other goods = $1). (5 points)

b) Suppose the government gives Cindy a $200 voucher that can only be spent on rental housing. Diagram Cindy’s new budget constraint. (5 points)

c) Assuming Cindy has typical convex preferences, will her expenditure on rental housing rise by $200, more than $200, or less than $200. Explain. (5 points)
d) Could the government increase Cindy’s utility by the same amount at a cost less than $200? If so, explain how. (5 points)

5) The Kahneman-Tversky value function shows that individuals behave as if their utility decreases by more given a $20 loss than it would increase with a $20 gain. Is this behavior irrational? If not, how does the Kahneman-Tversky value function related to irrationality? (10 points)
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