1 14.03 Exam 1: Part I: 5 points each

1. One expects the demand for chocolate chip cookies to be more inelastic than the demand for cookies taken as a whole.

2. Pablo consumes only two goods: candy bars and soda. If his consumption of soda increases when the price of soda increases, with the price of candy bars unchanged, then candy bars are a normal good for Pablo.

3. Indifference curves that are full concentric circles (circumsferences) in the positive xy quadrant exhibit the property of nonsatiation.

4. An increase in the minimum wage causes a decrease in the quantity of labor hired in both a perfectly competitive labor market and a monopsony labor market.

5. Given two goods that are perfect substitutes, there exists only one price ratio at which the consumer will consume positive amounts of both goods.

6. Consider the following welfare program reform in which the government reduces the program budget. The government goes from giving welfare recipients \$100 a month of food stamps (which cannot be resold for cash) to giving them \$90 in cash. As a result, welfare recipients are made worse off.

2 Part I: Solutions

1. False. If the price of cookies taken as a whole increases, consumers of cookies will substitute in the direction of other types of sweets such as pastries, cakes, candy bars. However, if only the price of chocolate chip cookies increases, consumers of chocolate chip cookies can switch to other types of cookies. The larger availability of substitutes for chocolate chip cookies makes its demand more elastic than that for cookies taken as a whole.

2. True. Given that the demand for soda increases as its price increases ($\frac{dS}{dP_s} > 0$), soda must be an inferior good, since with income declining (due to the increase in the price of soda and the fact that Pablo consumes only two goods) his consumption of soda increases (this amounts to the income effect $\frac{dS}{dI} < 0$). To remain on his budget line, he decreases his consumption of candy bars. Since his consumption of candy bars decreases with a decrease in income, candy bars are a normal good ($\frac{dC}{dI} > 0$).

3. False. Circular indifference curves violate nonsatiation as they exhibit a dot in the center called the bliss point at which utility is at its highest possible. At this point, the property that "more is better" is violated.

4. False (or uncertain). An increase in the minimum wage decreases the quantity of labor hired in a perfectly competitive market (given that minimum wages are set above the market clearing price). However, in a monopsony

labor market, the effect of an increase in the minimum wage on quantity of labor hired depends on whether the minimum wage was originally above the market clearing wage or below it (and above the monopsonist's wage level). If the minimum wage was originally above the market clearing wage, then employment would fall, just as in the competitive market case. However, if the minimum wage was originally below the market clearing price and above the monopsonist's wage, then employment would rise.

5. True. If two goods are perfect substitutes, the indifference curves that describe the trade-off between the consumption of the two goods are straight lines, i.e., the MRS between the two goods is constant. Only if the slope of the budget constraint equals the slope of the indifference curves, that is, the price ratio of the two goods equals the constant MRS, will the consumer consume positive amounts of both goods. Otherwise, the utility-maximizing point will be at a corner where only one good is consumed.

6. Uncertain. Welfare recipients will be at least as well off if they are given cash instead of an equivalent cash value of food, because with cash they can either spend it all on food or distribute it between food and other goods depending on which way of spending yields them higher utility. If the government gave welfare recipients less cash than the cash value of food, for example as in the question, \$90 in cash instead of \$100 worth of food stamps, it is possible that they would be better off if they sufficiently value the freedom to spend \$90.

14.03 exam 1, Part II. 9 points each. Answers.

1. Is the Marshallian demand curve always downward sloping (or vertical)? If your answer is yes, explain why. If your answer is no, under what condition is it upward sloping?

   Is the Hicksian demand curve always downward sloping (or vertical)? If your answer is yes, explain why. If your answer is no, under what condition is it upward sloping?

   Marshallian: maybe.

   The slope of the Marshallian demand curve is given by the Slutsky equation, which decomposes it into income and substitution effects:

$$\frac{\partial x}{\partial p_x} = \frac{\partial h_x}{\partial p_x} - x\frac{\partial x}{\partial I}$$

   where x is the Marshallian demand, h_x is the Hicksian demand, and I is income.

   The substitution effect is negative (see Hicksian below). But the income effect is positive or negative depending upon whether or not the good is normal or inferior. If the good is inferior and the income effect is strong enough, the good is a Giffen good, and so the Marshallian demand curve would be upward sloping. But under the usual assumption that the substitution effect outweighs the (possibly negative) income effect, the Marshallian demand curve is downward sloping.

   Hicksian: yes. In a two good case, the assumption that marginal rates of substitution are declining assures that Hicksian demand is downward sloping. (Since Hicksian demand traces out consumer decisions along a fixed indifference curve as the own good price, and hence the price ratio, change).

2. The *San Jose Mercury News* recently reported on the high cost of housing in Silicon Valley. A number of Silicon Valley residents are selling their houses or leaving apartments and moving into a recreational vehicle (RV) as their full-time home.

   "RV dwellers can be found in trailer parks, company parking lots and industrial side streets throughout Silicon Valley. The majority who resort to RV living – in trailers, camping shells or motor homes, complain it's the only way they can afford Silicon Valley, even on as much as a $55,000 salary."

   Analyze this consumer response to housing prices. Make sure to use terms from consumer theory in your analysis.

   This demonstrates the sensitivity of Marshallian demand for housing to the housing price. As housing prices in Silicon Valley have climbed, consumers have chosen to consume "less housing", in the form of a RV rather than a home or apartment. Or you could view them as substituting out of apartment housing and into RV "housing." Analyzed either way, these consumer choices illustrate the income and substitution effects of the Slutsky equation. Some students overlooked the income effect, but housing is a

big part of people's consumption, and the statement that people can't afford Silicon Valley any other way suggests that income effects are important here. (If you analyzed consumers as substituting out of apartment housing and into RV housing, you should identify apartment housing as a normal good and RV housing as an inferior good at prevailing prices and incomes).

Part III, Question 1

At date 1, Kevin could consume any point in $OEFG$. The revealed preference argument implies he prefers $(x, y) = (3, 20)$ to $(x, y) = (9, 15)$.

At date 2, he could consume any point below the line l. The revealed preference argument implies heprefers $(x, y) = (9, 15)$ to $(x, y) = (12, 6)$.

Transitivity of the preference implies he prefers $(x, y) = (3, 20)$ to $(x, y) = (12, 6)$.

At date 4, he can consume any point in OAB. At any point in the shaded area, he consumes more of good x and y than $(x, y) = (3, 20)$, so he strictly prefers this point than $(x, y) = (3, 20)$, which is better than $(x, y) = (12, 6)$.

So he doesn't want to stick to $(x, y) = (12, 6)$ any more.