1) A consumer has the utility function $U(x,y) = x + 2y^{1/2}$. The price of good *x* is 2 and the price of good *y* is 1. The consumer's income is 20. If the price of good *y* rises to 2, then entire change in demand for *y* is due to the substitution effect. True or false, justify.

2) Draw two different diagrams, one illustrating the Slutsky version of income and substitution effects and the other illustrating the Hicks version of income and substitution effects. How do these two notions differ?

3) If a utility maximizer is a net seller of something and the price of that good rises while other prices stay constant, her situation might improve so much that she becomes a net buyer.

4) Charlie consumes apples and bananas. His utility function is $\mathbf{U}(X_A, X_B) = x_A x^2_B$. The price of apples is \$1 the price of bananas is \$2, and his income is \$30 per week. If the price of bananas falls to \$1. Find the substitution and the ordinary income effect.

5) May's utility function is $U = C + 14D^{1/2} 2.5(H + J)^2$, where *C* is dollars spent on goods other than housecleaning, *D* is the number of hours per day that somebody spends cleaning her house, *H* is the number of hours per day May spends cleaning her house, and *J* is the number of hours per day May spends working at her job. All May's income comes from her job. She can work as many hours a day as she wishes at a wage of \$7 an hour.
   a. If she cannot hire anyone to do her housecleaning, how many hours will she spend on the job and how many hours will she spend housecleaning?
   b. If she can hire a housecleaner at \$5 an hour, how many hours will she work on her job, how many hours of housecleaning will she hire, and how many hours will she clean house?

6) Neville from your workbook has a friend named Peregrine. Peregrine has the same demand function for claret as Neville, namely $q = .02m - 2p$, where m is income and *p* is price. Peregrine's income is \$6,500 and he initially had to pay a price of \$50 per bottle of claret. The price of claret rose to \$60. Find the substitution and income effect.

7) Heather and Myrtle have the same tastes. Heather is paid \$10 an hour and chooses to work 9 hours a day. Myrtle is paid \$9 an hour for the first 8 hours she works and \$18 an hour for any time she works beyond 8 hours a day.
   a. Since she has the same tastes as Heather and can earn the same income by working 9 hours a day, she chooses to work 9 hours a day.
   b. Unless her indifference curve is kinked, Heather would be better off facing the same pay schedule as Myrtle.
   c. Myrtle would prefer Heather's pay schedule to her own.
   d. Myrtle will work less than 9 hours a day.
   e. None of the above.

   Justify your answer

3.15 (0) Olson likes strong coffee, the stronger the better. But he can't distinguish small differences. Over the years, Mrs. Olson has discovered that if she changes the amount of coffee by more than one teaspoon in her six-cup pot, Olson can tell that she did it. But he cannot distinguish differences smaller than one teaspoon per pot. Where A and B are two different cups of coffee, let us write $A \succ B$ if Olson prefers cup A to cup B. Let us write $A \succeq B$ if Olson either prefers A to B, or can't tell the difference between them. Let us write $A \sim B$ if Olson can't tell the difference between cups A and B. Suppose that Olson is offered cups A, B, and C all brewed in the Olsons' six-cup pot. Cup A was brewed using 14 teaspoons of coffee in the pot. Cup B was brewed using 14.75 teaspoons of coffee in the pot and cup C was brewed using 15.5 teaspoons of coffee in the pot. For each of the following expressions determine whether it is true of false.

(m) $B \succ C$.

(n) $A \succ C$.

(o) $C \succ A$.

(p) Is Olson's "at-least-as-good-as" relation, $\succeq$, transitive?

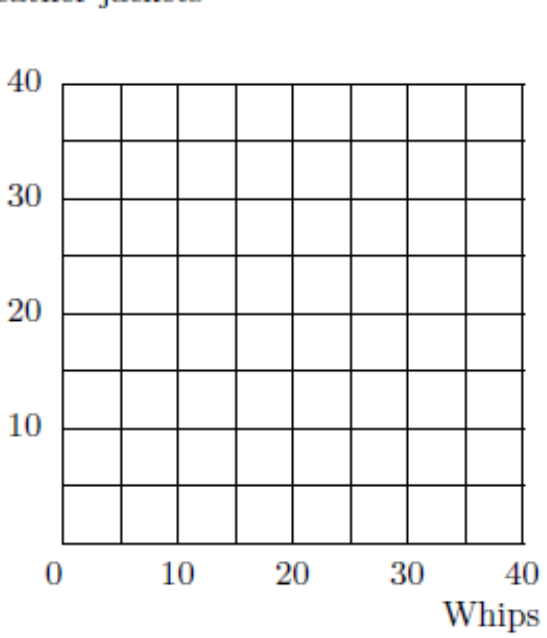
(q) Is Olson's "can't-tell-the-difference" relation, $\sim$, transitive?

(r) is Olson's "better-than" relation, $\succ$, transitive.

6.13 (1) Here is a puzzle for you. At first glance, it would appear that there is not nearly enough information to answer this question. But when you graph the indifference curve and think about it a little, you will see that there is a neat, easily calculated solution.

Kinko spends all his money on whips and leather jackets. Kinko's utility function is $U(x, y) = \min\{4x, 2x + y\}$, where x is his consumption of whips and y is his consumption of leather jackets. Kinko is consuming 15 whips and 10 leather jackets. The price of whips is \$10. You are to find Kinko's income.

(a) Graph the indifference curve for Kinko that passes through the point $(15, 10)$. What is the slope of this indifference curve at $(15, 10)$?_____ What must be the price of leather jackets if Kinko chooses this point?_____ Now, what is Kinko's income?_____.



6.7 (1) Mary's utility function is $U(b, c) = b + 100c - c^2$, where b is the number of silver bells in her garden and c is the number of cockle shells. She has 500 square feet in her garden to allocate between silver bells and cockle shells. Silver bells each take up 1 square foot and cockle shells each take up 4 square feet. She gets both kinds of seeds for free.

(a) To maximize her utility, given the size of her garden, Mary should plant 308 silver bells and 48 cockle shells. (Hint: Write down her "budget constraint" for space. Solve the problem as if it were an ordinary demand problem.)

(b) If she suddenly acquires an extra 100 square feet for her garden, how much should she increase her planting of silver bells? 100 extra silver bells. How much should she increase her planting of cockle shells? Not at all.

(c) If Mary had only 144 square feet in her garden, how many cockle shells would she grow? 36.

(d) If Mary grows both silver bells and cockle shells, then we know that the number of square feet in her garden must be greater than 192.