Answers to Sample Final

[a] True. The locus of Pareto-optimal allocations is just those points, starting from which you cannot improve on the utility of *both* persons simultaneously. Initial endowments simply determine starting utilities and have no role to play in this matter. [An Edgeworth box diagram showing the Pareto-optimal locus will help.]

[b] False. He charges prices that are *inversely* related to elasticity of demand, not directly. To see this, notice that the monopolist sets MR to the same value in all markets (to the common value of his MC). Thus in any two markets i and j, $MR_i = MR_j$. Now $MR_i = P_i[1 - (1/e_i)]$ and $MR_j = P_j[1 - (1/e_j)]$, where the e's denote price elasticities of demand. It follows that if $e_i < e_j$, then $P_i > P_j$.

[c] True. Take, for example, price discrimination of the first degree in which a perfectly discriminating monopolist charges different prices for each unit that he sells. In that case, the marginal revenue for the monopolist becomes identical to the demand curve (because an additional unit sold has no effect on the price at which he sold pervious units). The profit maximizing condition states that MR = MC, which means that the monopolist produces at the intersection of the demand curve and the marginal cost curve (draw diagram). This is exactly the same output level as the one which would have been produced by a competitive market.

[d] False. Marginal revenue can fall whether or not we are in the elastic or inelastic section of a demand curve (the linear demand curve beinga good example of this). The point is that marginal revenue becomes *negative* when the demand curve is inelastic. Recall the formula $MR = P[1 - (1/e)]$, where P is price and e is elasticity: it follows that when $e, 1$ then MR is negative. Another way of seeing this is to note that when quantity is expanded (or price decreased), total revenue *falls* along an inelastic demand curve. This is just another way of saying that the *marginal* revenue (the increment to tatal revenue) is negative.

[e] True. See textbook, page 144 and Figure 5.21.

[f] False. Free-entry monopolistic competition gives us an equilibrium which is to the left of the average cost minimum. [Draw diagram.] All this says is that if variety were to be reduced, average costs of production could be brought down. But reduced variety is also a social loss. In general, a monopolistic competition equilibrium can over- or under-produce the socially optimal variety, as the discussion in the textbook (pages 471–472) makes clear.

[g] True. Draw a diagram with indifference curves that are perfect substitutes. Then show that for any relative price which is *not* the same as the slope of the indifference curves, the consumer must only consume *one* of the two goods. The *only* situation in which it is optimal to consume both goods is when the consumer faces a relative price exactly equal to the slope along her indifference curve.

[h] False. If the interest rate is positive (which it is), then the present value must go *up*. Recall that an amount of $10 in year n is valued as

$$\frac{10}{(1+i)^{n-1}}$$

as far as present value is concerned. So a loss of 10 in year $n+1$ which is compensated by a gain of 10 in year n must raise present value by the amount

$$\frac{10}{(1+i)^{n-1}} - \frac{10}{(1+i)^n}.$$

[i] True. This will require you to draw a diagram and provide the following explanation: when the wage rate goes up, there is a substitution effect and an income effect. The substitution effect
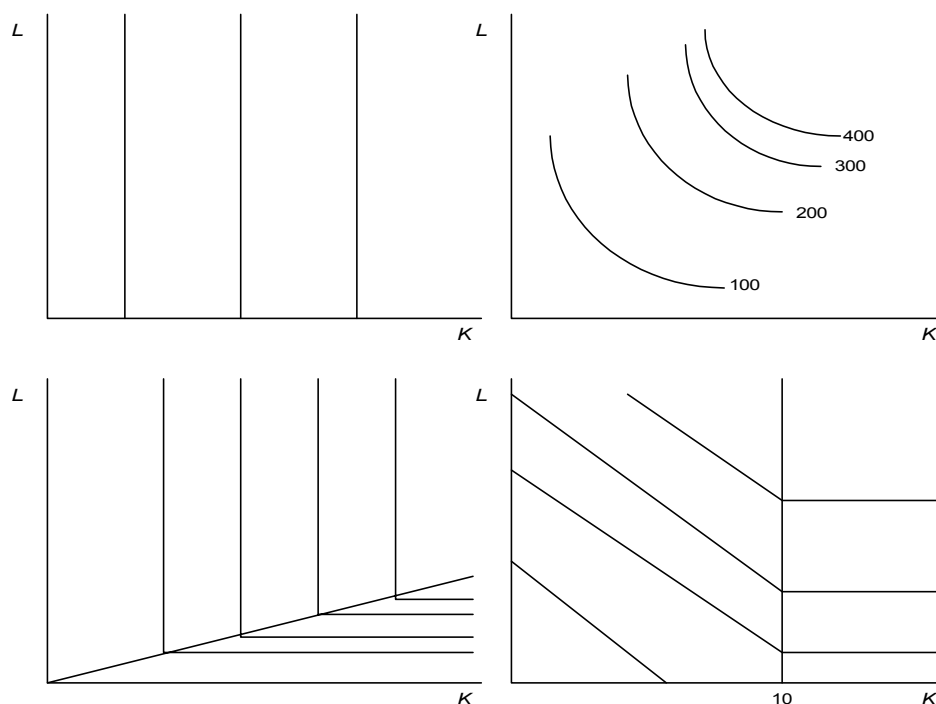
Figure 1: Isoquants.

increases the (opportunity) cost of leisure — leisure becomes more expensive. Because we know that substitution effects always have the correct sign, we know that the demand for leisure will go down on this account. Next, the income effect is positive (wages have gone up), and because leisure is inferior, this *also* reduces the deamnd for leisure. So the substitution effect and the income effect agree, and in both cases the demand for leisure comes down. That is, the supply of labor goes up.

[**j**] False. Completeness of ranking has nothing to do with transitivity. For instance, if there are three alternatives, it is possible that I prefer A to B, B to C, and C to A. This is a complete description but it is not transitive.

(**2**) (**60 points, 10 points per part**) Answer the following questions briefly and clearly. You can put in a diagram, and/or a simple example to illustrate. *These are not true-false questions.*

(**i**) (a) I will do part (a); follow this for (b). Suppose that the common MRS between A and B is $x : 1$; that is, individuals would need x units of A to compensate them for a loss of one unit of B. Suppose that the marginal rate of transformation is $y : 1$, with y different from x. Let's say $y > x$. The produce one unit less of B and produce y units more of B. Everubody pays their share of the one unit loss of B and gets reimbursed with an eqyual share of the one unit gain. Since $y > x$, everybody is better off. The reverse argument (produce less of A) holds if $y < x$.

(**ii**) [I leave out explanations, which you should provide.] (a) there is only one Pareto-optimal allocation this case, that in which 1 is given all of good A and 2 is given all of good B. (b) There is an infinite number of P.O. allocations corresponding to all the mixes of A and B that can be produced along the PPF; in each case, give all A to 1 and all B to 2. (c) Here there are also an infinite number of P.O. allocations, First only A should be produced. Then any division of A between 1 and 2 is P.O.

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(iii) Done in class in detail.

(iv) The key to this question is to understand when the MR is zero along a linear demand curve. We know that the elasticity is one at the middle of this curve; namely, when the price hits 9. Because MC = 0, we equate MR to MC when the price is 9 and the quantity is 9. Therefore this describes the monoppolist's profit-maximizing point. You should draw labelled diagrams to accompany this.

(v) See Figure 1. You should provide brief explanatory notes.

(vi) Done in class in detail.