Supplement Questions: Optimum Choice, Corner Solution, Derivation of Demand Curve and Budget Line

1. Erica purchases food (x) and clothing (y). His utility function is $U_{(x,y)} = \sqrt{xy}$. Her monthly income is \$800. The price of the food is P_x = \$20 and the price clothing is P_y = \$40. Find her optimum consumption bundle and corresponding utility.
   (Ans.: x = 20 and y = 10 and U = $\sqrt{200}$)
2. Considering utility function: $U_{(x,y)} = x + y$ and the price of good x (P_x) is 3 and the price of good y (P_y) is 4, with income = 48. What would be the optimum consumption bundle and corresponding utility and corresponding utility?
   (Ans.: Corner Solution, buy all x = 48/3 = 16)
3. David is considering his purchases of food (x) and clothing (y). He has the utility function which is $U_{(x,y)} = xy + 10x$. His income is \$10. The price of food is P_x = \$1 and the price clothing is P_y = \$2. What is David's optimal basket?
   (Ans.: Corner Solution, you'll get x = 15 and y = -2.5, so buy all x = 10)
4. Tony likes to purchase round trips between the cities of Bangkok and Khon-kaen and others goods out of her income of 100,000 baht a year. Fortunately, Nok-air provides air service and has a frequent flyer program. A round trip between the two cities normally costs 5000 baht, but any customer who makes more than 10 trips a year gets to make additional trips during the year for only 2500 baht per round trip. Draw the Tony's budget line.
5. Paul consumes only two goods, pizza (P) and steak (S), and considers them to be perfect substitutes, as shown by his utility function: $U_{(P,S)} = P + 4H$. The price of pizza is \$3 and the price of steak is \$6, and Paul's monthly income is \$300. Knowing that he likes pizza, Paul's grandmother gives a voucher of \$60 redeemable only at Pizza Hut. Though Paul is happy to get this gift, his grandmother did not realize that she could made him exactly as happy by spending far less than she did. How much would she have needed to give him in cash to make him just as well off as with the voucher? (a bit tricky, using graph will be helpful)
6. A consumer purchases two goods: food and clothing. The consumer's utility function is $U_{(x,y)} = \sqrt{xy}$ where x denotes the amount of food consumed and y the amount of clothing. The price of food is P_x and the price of clothing is P_y and the income is I
   a. Show that the equation for demand curve for food is $x = \frac{I}{2P_x}$
   b. Show that the equation for demand curve for clothing is $y = \frac{I}{2P_y}$
   c. Are the food and clothing a normal or inferior good?
7. Suppose that a consumer's utility function is $U_{(x,y)} = xy + 10y$. The price of x is P_x and the price of y is P_y, with both P_x and P_y positive. The consumer income is I. Show that the demand curve of good x is $x = \frac{I}{2P_x} - 5$

Note: Optimum Choice; $MRS_{x,y} = \frac{MU_x}{MU_y} = \frac{P_x}{P_y} = Price\ Ratio$