Problem Set #5
Income and substitution effects, present discounted value

Question 1
1. Consider a consumer choosing between two goods, X and Y. As depicted in the graph, the price of X falls, and the consumer decides to continue to purchase exactly the same amount of X. Is X a normal good or an inferior good? (How can you tell?)

A. Normal
B. Inferior
C. Cannot tell

Question 2: Medicaid Part D
2. Medicaid Part D
The new, $1.3 trillion, Medicare Prescription Drug benefit began operation January 1, 2006. The program is complex, but at its most basic, individual benefits work as follows:
i) Drug expenses up to $250 per year are not covered at all. Individuals pay 100% of the cost. (This is the deductible.)
ii) For drug expenditures from $250 to $2250, 75% is paid by Medicare. (Individuals pay 25%.)
iii) For drug expenditures from $2250 to $5100, Medicare pays nothing. (This is called the "doughnut hole" for some reason I've never understood.)
iv) For drug expenditures above $5100, Medicare pays 95%. Individuals pay 5%. (This is catastrophic coverage.)

Consider an individual who is eligible for Medicare and has $20,000 per year to spend on prescription drugs, or "other goods." On a separate piece of paper, draw a pair of axes with prescription drugs on the bottom axis, and "other goods" on the left axis. Now on those axes, carefully draw this person's budget constraint. Be sure to label all slopes, kink points, and intercepts.

Now file this piece of graph with your notes for future reference. It will not be a graded part of this problem set.

Scenario
Charise has a bond with a face value of $5,000. The bond's coupon rate is 12% and the bond matures in 3 years.

Question 3.1
3.1. If she tries to sell the bond today and the market interest rate is currently 8%, how much can she receive for it?

Please enter a whole number, with no decimal point.

Question 3.2
3.2. What is the new value of the bond when the market interest rate goes up to 15%?

Please enter a whole number, with no decimal point.

Question 3.3
3.3. Has the value increased or decreased as compared with the calculated in part (1)?

A. Increased
B. Decreased

Question 3.4
3.4. What is the value of the bond if the interest rate is 12%?

Please enter a whole number, with no decimal point.

Scenario
Charise has a bond with a face value of $5,000. The bond's coupon rate is 12% and the bond matures in 3 years.

Question 4.1
4.1. What is the present discounted value of a perpetuity paying $56 per year forever (starting next year) if the interest rate (discount rate) is 5%?
Please enter a whole number, with no decimal point.

**Question 4.2**

4.2. What is the present discounted value of an annuity paying $56 per year (with payment #1 coming at the end of one year) for 34 years if the interest rate (discount rate) is 5%?

Please enter a whole number, with no decimal point.

**Scenario: Financing car purchases**

**Financing car purchases**

4. Suppose you go to buy a GM car. The car is priced at $24,000. The salesperson offers you interest-free financing, for three years, with no money down. Or, she tells you that if you pay cash for the car, you get $3000 cash back. To make things simple assume this means you pay $8,000 at the end of the first year, $8,000 at the end of the second year, and $8,000 at the end of the third year after buying the car.

Suppose the market interest rate, at which you can borrow or lend, is 5 percent.

**Question 5.1**

5.1. a) What is the present discounted value of the cost of the car if you pay cash?

Please enter a whole number, with no decimal point.

**Question 5.2**

5.2. b) What is the present discounted value of the cost of the car if you use GM's interest-free financing?

Please enter a whole number, with no decimal point.

**Question 5.3**

5.3. Which option should you choose to minimize your economic costs?

- A. Pay cash.
- B. Finance the car.
- C. They are both the same.

**Question 5.4: Challenge question.....**

5.4. Challenge question.....

Which of the numbers below most closely represents the "annual percentage rate" (APR) of the car loan. (They advertise zero, but if you've done the calculation correctly so far, there is a cost of using the financing.)

- A. 5 percent
- B. 6.999 percent
- C. 2.581 percent
- D. 7.822 percent
- E. 0.00 percent

**Question 6: Another household choice problem...**

6. Another household choice problem...

Bob devotes his meal budget to two types of dinners: take-out Chinese food, which costs $12, and take-out Thai food, which also costs $12. He has $240 per month to spend on take-out food.

Bob tells you that at those prices ($12 and $12), his best affordable plan is to purchase take-out Chinese 12 times, and take-out Thai 8 times.

One month, the price of take-out Chinese meals falls to $10, while the price of take-out Thai rises to $14. Is Bob better off, worse off, or indifferent to the price change?

- A. Better-off
- B. Worse-off
- C. Indifferent
- D. It is not possible to tell given this information.