

From the book: 3.4, 3.13, 4.7, 4.9 a,c,d

- 1) Charlie consumes apples and bananas. His utility function is $U(A,B)=AB$. His income is \$40. The price of apples is \$1 and the price of bananas is \$2. Suddenly, the price of bananas falls to \$1.

$$MRS = \frac{P_A}{P_B} \rightarrow \frac{B}{A} = \frac{1}{2} \rightarrow 2B = A \rightarrow 40 - 4B = 0 \quad \begin{matrix} B = 10 \\ A = 20 \end{matrix}$$

- a) Before the price change, Charlie consumed 20 apples and 10 bananas per day. On graph paper, use black ink to draw Charlie's original budget constraint and label the chosen bundle M.
- b) If, after the price change, Charlie's income had changed so that he could stay on exactly the same indifference curve, his new income would have been 28. With this income and new prices, Charlie would consume 14 apples and 14 bananas. On the same graph, use red ink to draw the budget line corresponding to this income and these prices. Label the bundle that Charlie would choose at this income and the new prices with the letter Q.
- c) Does the substitution effect of the fall in the price of bananas make him buy more bananas or less bananas?

more

- d) How many more or less bananas does he buy?

$$14 - 10 = 4$$

- e) After the price change, Charlie actually buys 20 apples and 20 bananas. Use blue ink to draw Charlie's actual budget line after the price change. Label the bundle that he actually chooses after the price change with a C. Draw 3 horizontal lines on your graph, one from M to the vertical axis, one from Q to the vertical axis and one from C to the vertical axis. Along the vertical axis, label the income effect, the substitution effect and the total effect on the demand for bananas.

$$B/A = 1 \rightarrow A = B \rightarrow 40 - 2B = 0 \rightarrow B = 20 \quad A = 20$$

- f) Does the income effect make him consume more bananas or less? more How many more or how many less? 6

- g) Does the substitution effect of the fall in the price of bananas make Charlie consume more apples or less? less How many more or less? 6 Does the income effect of the fall in the price of bananas make Charlie consume more apples or less? more What is the total effect of the change in the price of bananas on the demand for apples? 0

- 2) Neville's passion is fine wine. When the prices of all other goods are fixed at current levels, Neville's demand function for high-quality claret is $Q = .02M - 2P$, where M is his income and P is the price of claret in british pounds. Q is the number of bottles of claret that he demands. Neville's income is 7,500 pounds, and the price of a bottle of claret is 30 pounds.

- a) How many bottles of claret will Neville buy?

$$Q = .02(7500) - 2(30) = 150 - 60 = 90$$

with 7500 - 2700
= 4800 to spend
on other goods

- b) If the price of claret rose to 40 pounds, how much income would Neville have to have in order to be exactly able to afford the amount of claret and the amount of other goods that he bought before the price change? This isn't exactly the amount of income necessary to compute the substitution effect but it will give us a good approximation.

$$4800 + 40(90) = 8400$$

- c) At this income, and a price of 40 pounds, how many bottles would Neville actually buy?

$$Q = .02(8400) - 2(40) = 168 - 80 = 88$$

- d) At his original income of 7,500 and a price of 40, how much claret would Neville demand?

$$Q = .02(7500) - 2(40) = 150 - 80 = 70$$

- e) When the price of claret rose from 30 to 40, the number of bottles that Neville demanded decreased by how much?

$$90 - 70 = 20$$

- f) Did the substitution effect lead to an increase or a decrease in his demand for claret?

Decrease. Claret is now relatively more expensive than it was initially

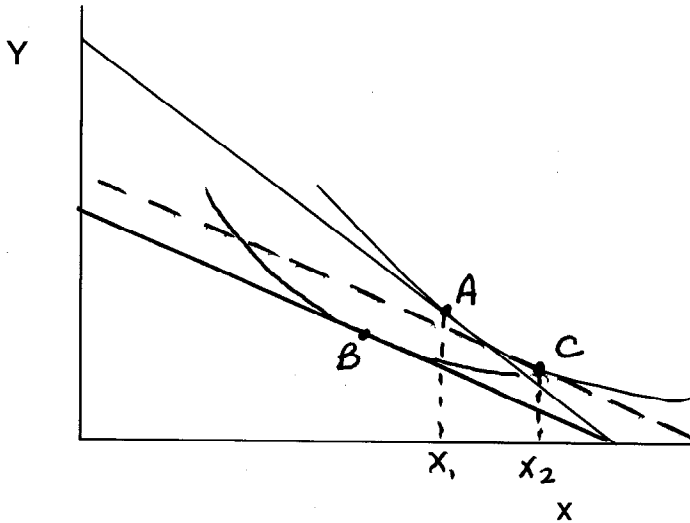
- g) By how much?

2 Bottles

- h) How much did the income effect increase or decrease the demand for claret?

18 Bottles

- 3) The questions a)-d) all refer to the diagram below.



- a) Show the substitution effect resulting from an increase in the price of Y. How does this change the amount of X and Y consumed?

$X \uparrow$
 $Y \downarrow$

- b) Is Y an inferior good?

Yes income effect: $I \downarrow \Rightarrow Y \uparrow$

- c) Is Y a Giffen good?

Yes $\uparrow P_Y \Rightarrow \uparrow Y$

- d) Which effect dominates the change in consumption of Y?-- the income effect or the substitution effect?

Income

- e) Are X and Y complements or substitutes?

$\uparrow P_Y \Rightarrow \downarrow X$ complements

- 4) Elizabeth can work as many days each year as she wants, at a daily wage of \$50.

- a) On graph paper, sketch Elizabeth's budget constraint in a leisure-consumption diagram.

- b) Suppose that Elizabeth's parents give her \$500 per year. Show how this affects her budget constraint on the diagram.

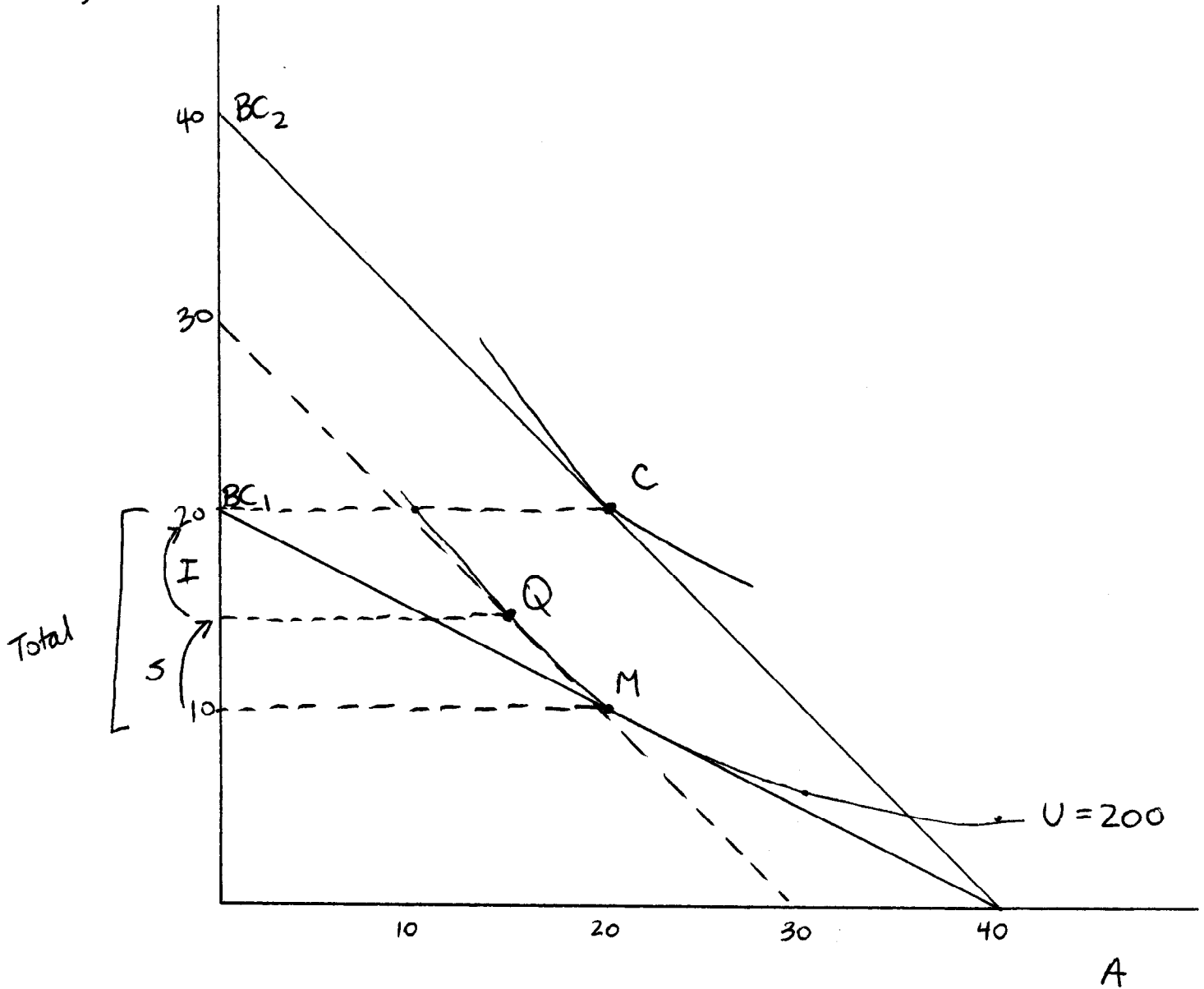
- c) Use the diagram, together with indifference curves, to show how the income from her parents affects Elizabeth's ~~hours~~ of work.

days

- 5) The government levies a 30% wage tax on Cleopatra. It uses the money to finance a parade. The parade's value to Cleopatra is just sufficient to make her as well off as she was before the tax was levied.

What is the effect of the government tax and expenditure package on Cleopatra's labor supply? (Hint: use the theory of substitution and income effects). Show this on a diagram.

1
b)



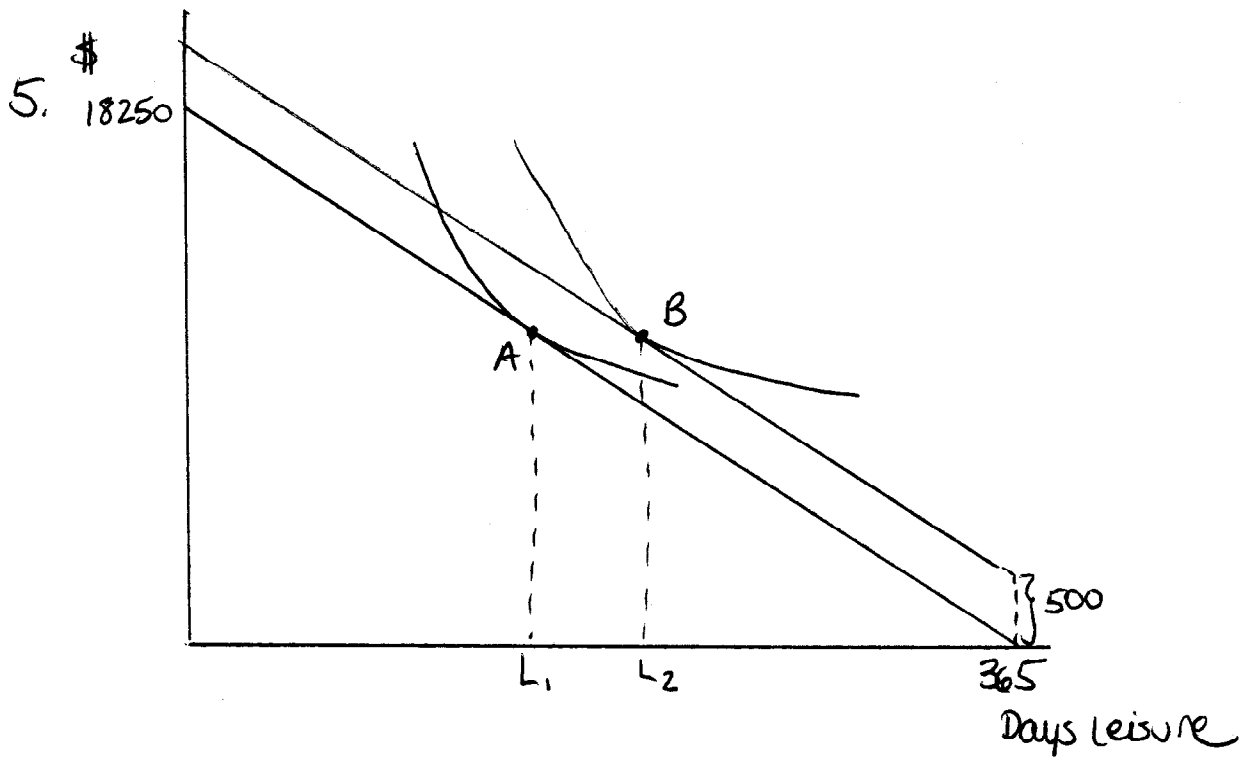
Find A, B such that $U = 200 = AB$ and $P_A = P_B = 1$

$$\frac{\frac{\partial U}{\partial A}}{\frac{\partial U}{\partial B}} = \frac{B}{A} = 1 \quad \text{so } A = B$$

$$200 = A^2 \quad A = \sqrt{200} = 14$$

$$B = 14$$

So new I must be $14 + 14 = 28$



Income effect \Rightarrow you feel richer so consume more normal goods $\Rightarrow \uparrow L \Rightarrow \downarrow$ Hrs Work
 since $H = (365 - L)$

