Chapter 22 Practice Problems Solutions

Elements of Microeconomics - Section 4

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Question 1

Suppose a consumer has a budget of \$100. They consume two goods: apples and bananas. The price of apples is \$2 per unit, and the price of bananas is \$4 per unit.

1. Write the equation for the consumer's budget constraint and draw the graph.

2. If the consumer spends their entire budget, how many units of apples and bananas can they buy if they allocate \$40 to apples and the rest to bananas?

3. The consumer prefers to have an equal number of apples and bananas. Given this preference, how many of each would they buy? How are these indifference curves represented graphically?

4. A different consumer prefers to consume 2 apples for every banana they consume. Given this preference, how many of each would they buy? How are these indifference curves represented graphically?
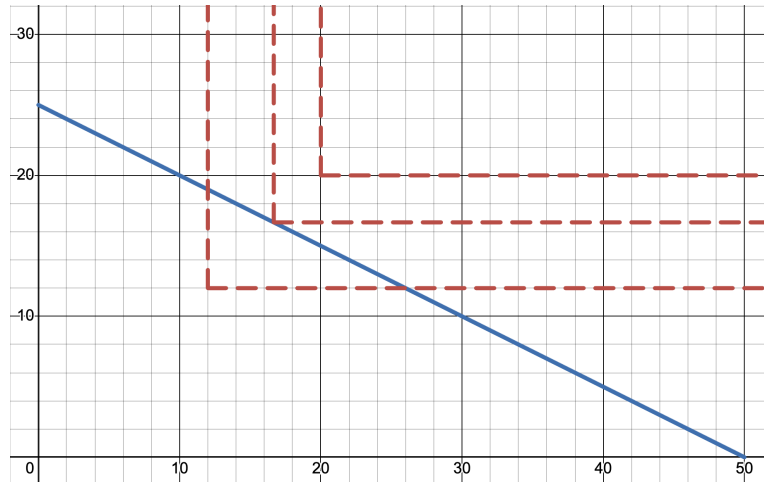
Answer

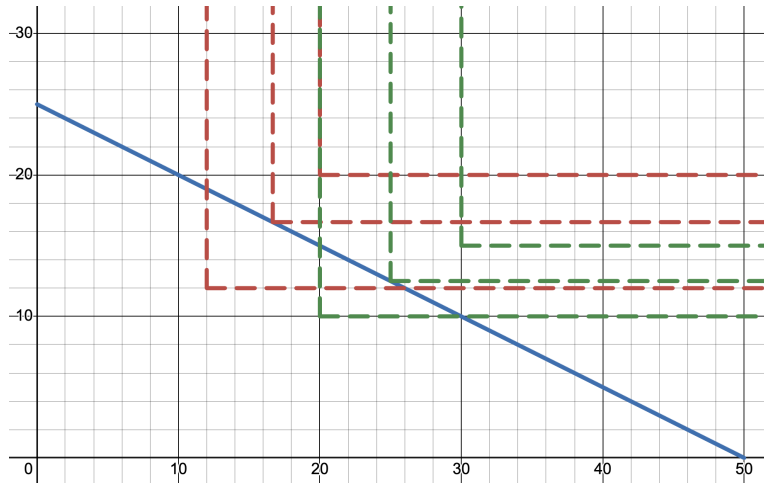*Part 1:* Budget constraint - $B = 25 - 0.5A$
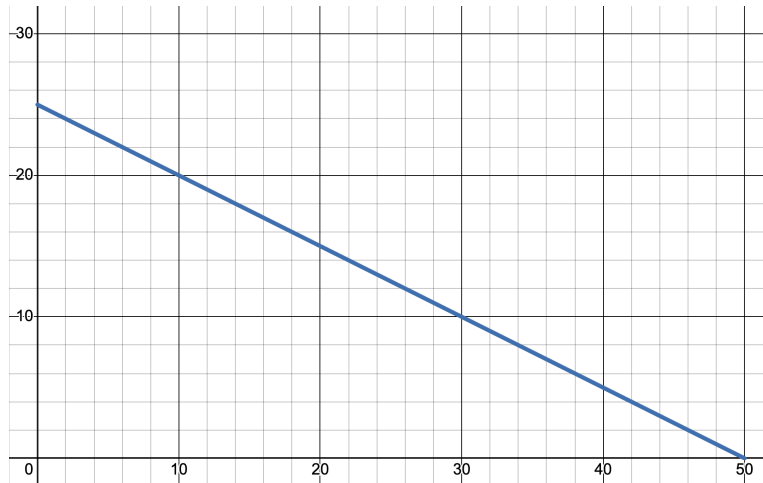
Part 2: They will have 20 apples and with the \$60 left over they will purchase 15 bananas.

Part 3: In this case $B = A$ so $A = 25 - 0.5A$. This implies $1.5A = 25$ so $A = 16.67$. Therefore $B = 16.67$. Note $16.67 \cdot \$2 + 16.67 \cdot \$4 = 100$.

Part 4: In this case $B = 0.5A$ so $0.5A = 25 - 0.5A$. This implies $A = 25$. Therefore $B = 12.5$. Note $25 \cdot \$2 + 12.5 \cdot \$4 = 100$.


Question 2

A consumer has a budget of \$120 and consumes two goods: pens and notebooks. Initially, the price of a pen is \$4, and the price of a notebook is \$6.

1. Write the initial equation for the consumer's budget constraint. Draw the graph for the budget constraint

2. Assume the consumer spends an equal amount on each good. Label the optimal consumption point.

3. The price of pens rises by \$2. Show the change in the budget constraint in your diagram. Assume now that the consumer spends only 30% of their income on notebooks. Label the new optimum.

4. What happened to the quantity of pens consumed as a result of the price change? Explain this using the income and substitution effects.

5. Use the two points found to draw the consumer's demand curve for pens. What kind of good is this?
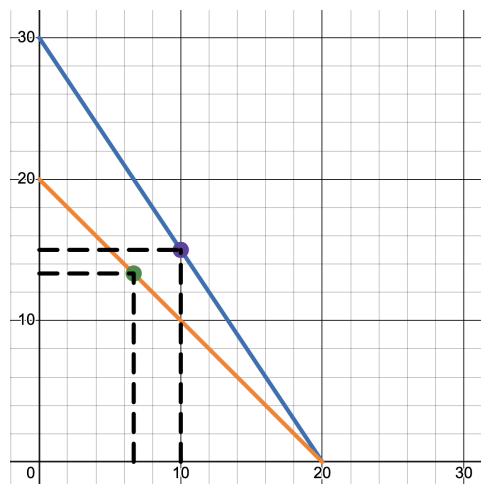
Answer

Part 1: Budget constraint - $P = 30 - 1.5N$
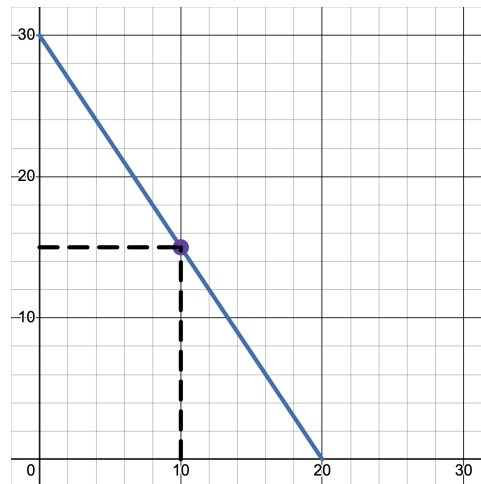
Part 2: The consumer will buy 15 pens and 10 notebooks

Part 3: New budget constraint - $P = 20 - N$. The consumer will now buy 6 notebooks and 14 pens.


Part 4: The number of pens purchased decreased. The income effect is negative because the consumer can now categorically consumer less than she could before. The substitution

effect is also negative because pens are now relatively more expensive. Therefore as both the substitution effect and income effect are both negative, the quantity demanded of pens will decrease.

Part 5: We know

$$\frac{\Delta y}{\Delta x} = \frac{4 - 6}{15 - 14} = \frac{-2}{1} = -2$$

. At a price of $4, demand is 15. So to find the intercept, it is $4 + (15 \cdot 2) = 34$. So the demand curve is $y = 34 - 2x$
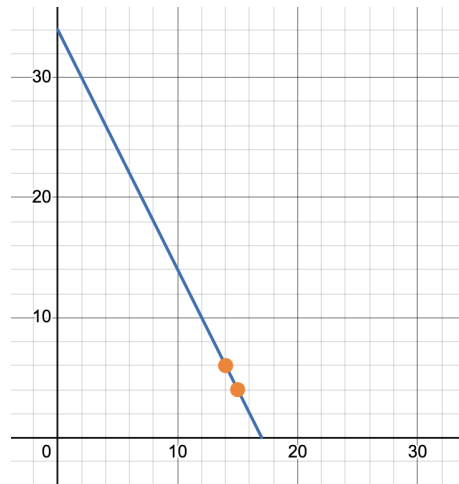

Question 3

Consider a situation where you order both a soft drink and pizza together. The pizza shop has weeks in which they have deals on pizzas that make them cheaper.

1. Show using budget constraints and indifference curves how this decrease in the price in pizza could lead you to either consumer more, less, or the same amount of soft drinks.

2. What property of consumer theory is driving these different results?

3. Explain the magnitude of the substitution and income effects in each scenario for soft drinks.

Answer

Part 1:

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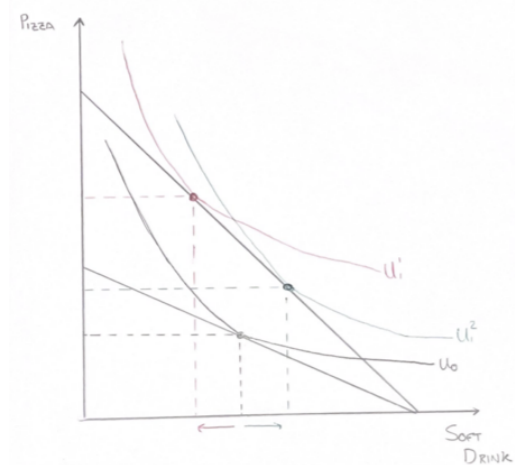
Part 2: Different marginal rates of substitution.

Part 3: In the scenario where less soft drinks are consumed, the negative substitution effect outweighs the positive income effect. In the scenario where consumption of soft drinks does not change, the negative substitution effect and positive income effect are equal in magnitude. In the case when more soft drinks are consumed, the positive income effect is larger in magnitude than the negative substitution effect.