Microeconomics Group45 吴熙楠

Homework02

Contents

1 Problem 1

Answer:

(a)No, bacause $A \succeq B$ and $B \succeq C$, but $C \succ A$.

(b)No, because $B \sim A$ and $C \sim B$, but $C \succ A$.

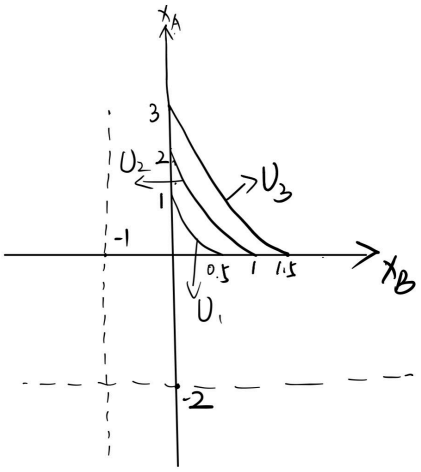
(c)Yes, because if $x \succ y$, then x has over one teaspoon per cup than y, also if $y \succ z$, then y has over one teaspoon per cup than z. So x has over two teaspoons per cup than z, then $x \succ z$.

2 Problem 2

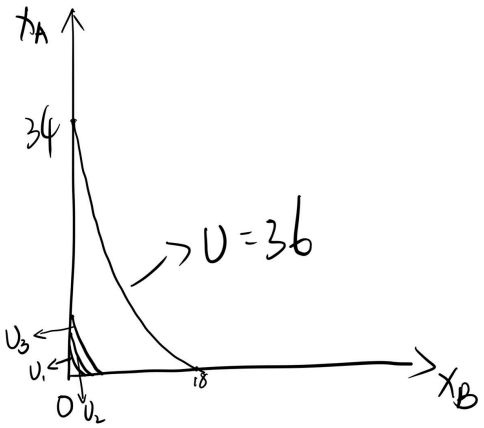
Answer:

(a)$(x_A + 2)(x_B + 1) = U$, for U is a constant and $U \geq 2, x_A, x_B \geq 0$.

(b)Given that $U_1 = 3, U_2 = 4, U_3 = 5$, we can draw a figure as shown below.



(c)(Because $U = 36$ is so much bigger than U in the previous picture, I drew a new picture.)



3 Problem 3

Answer:

(a)$x_A + 2x_B = 40, \quad \text{for } x_A, x_B \geq 0$

(b)$x_A = 40 - 2x_B$ and $x_A = \dfrac{U}{x_B}$, also we can know that if we choose the best bundle, then we have this equation:$-2 = -\dfrac{U}{x_B^2}$

We can figure out that $x_A = 20, x_B = 10$

(c)$U = x_A x_B = 20 \cdot 10 = 200$

(d)$m' = 20 + 3 \times 10 = 50$, for $p'_B = 3$ and $m' = 50$, according to question(c), we can calculate that $x'_A = 25, x'_B = \dfrac{25}{3}$

For $p'_B = 3$ and $m = 40$, also according to question(c), we can calculate that $x''_A = 20, x''_B = \dfrac{20}{3}$

Then we can calculate the substitution effect:$\Delta x_A^s = x'_A - x_A = 5, \Delta x_B^s = x'_B - x_B = -\dfrac{5}{3}$, and also the income effect:$\Delta x_A^n = x''_A - x'_A = -5, \Delta x_B^n = x''_B - x'_B = -\dfrac{5}{3}$

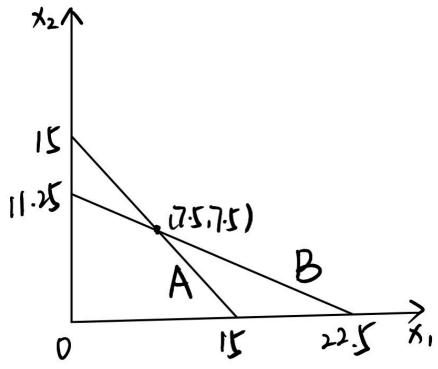
We can see that $\Delta x_A = x_A^s + x_A^n = 0, \Delta x_B = x_B^s + x_B^n = -\dfrac{10}{3}$

4 Problem 4

Answer:

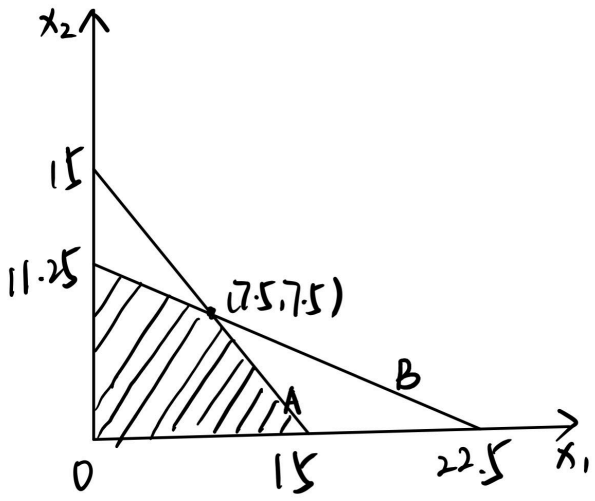
(a)For the first week, $m = 7.5 \times 4 = 30$; and for the second week, $m' = 7.5 \times 2 + 7.5 \times 4 = 45$

Given that x_1 is the number of pounds Frank consumed tomatoes, and x_2 is the number of pounds Frank consumed beef. Then we can draw the graph below:



Line A is the budget line for the first week, and line B is the budget line for the second week.

(b)

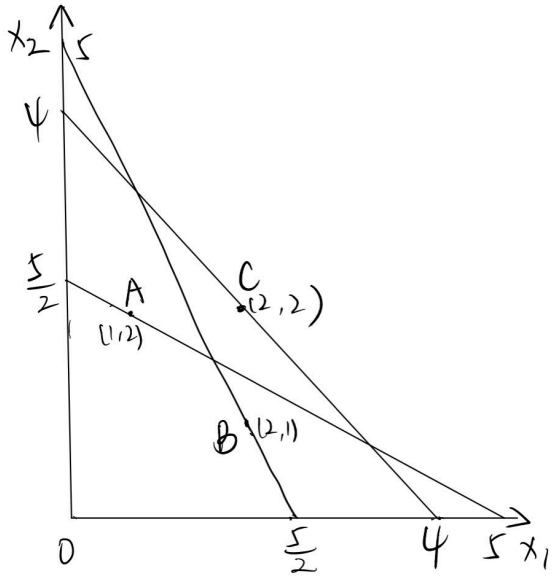


The shaded area is the one he won't purchase with this budget.

5 Problem 5

Answer:

Yes, this consumer' s choices violate the Weak Axiom of Revealed Preference.



Because for the first budget line, he chose A when he could choose A or B, so A was revealed preferred to B. But for the second budget line, he chose B when he could choose A or B. So his choices violate the Weak Axiom of Revealed Preference.

6 Problem 6

Answer:

(a)The expected utility of buying insurance is $(0.9\sqrt{16-R}+0.1\sqrt{16-x-R})$.

(b)The expected utility of not buying insurance is 3.85 ($0.9\sqrt{16}$+$0.05\sqrt{16-7}$+$0.05\sqrt{16-12}$=3.85).

(c)The equation: $0.9\sqrt{16-R}+0.1\sqrt{16-x-R}=3.85$, and R can be solved by this equation.

7 Problem 7

Answer:

(a)Given that α is the probability of planting A and $1-\alpha$ is the probability of planting B.

Then $U=0.5\sqrt{2500\times\alpha+1600\times(1-\alpha)}+0.5\sqrt{400\times\alpha+900\times(1-\alpha)}$

So $U=0.5\sqrt{900\alpha+1600}+0.5\sqrt{900-500\alpha}$

$\frac{dU}{d\alpha}=25(\frac{9}{\sqrt{900\alpha+1600}}-\frac{5}{900-500\alpha})=0$

We can solve that $\alpha=\frac{47}{90}, U=\frac{7\sqrt{230}}{3}\approx 35.387$

(b)If we only plant A, $U'=0.5\sqrt{2500-400}+0.5\sqrt{400+400}=5\sqrt{21}+10\sqrt{2}\approx 37.055$

We can know that $U'\approx 37.055 > U\approx 35.387$, so we can only plant A and buy insurance.