

Solutions Problem Set 2

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1 Solutions for Chapter 4

Solution for Exercise 1.

$$b \succ c \succ a$$

Solution for Exercise 2.

$$u(a) = 1, u(b) = 3, u(c) = 2$$

Solution for Exercise 3.

$$(4, 5) \sim (16, 3)$$

Solution for Exercise 4.

$$(4, 4) \sim (8, 2)$$

Solution for Exercise 5.

1. $u(p) = 3, u(q) = 2, u(r) = 1$, or similar.
2. $u(p) = 3, u(q) = 3, u(r) = 3$, or similar.

Solution for Exercise 6.

$$(0, 7)$$

Solution for Exercise 7.

$$(6, 6)$$

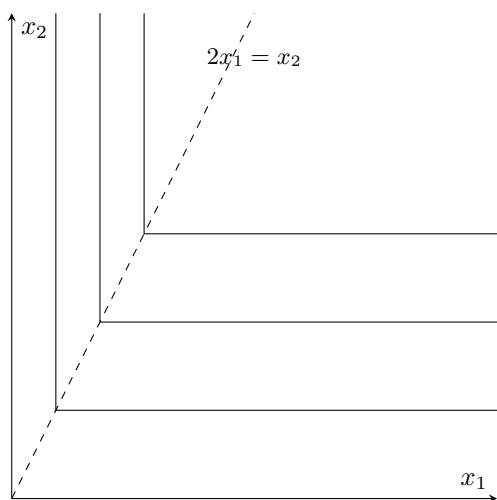
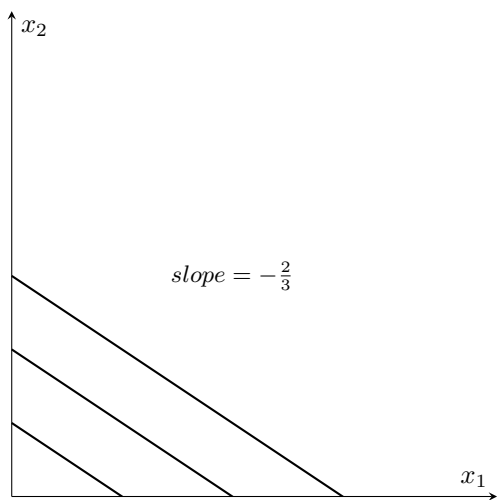
Solution for Exercise 8.

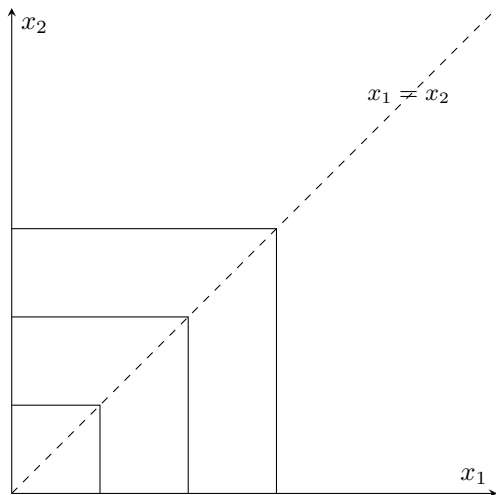
- $-\frac{3}{2}, -\frac{3}{2}$
- $-\frac{x_2}{x_1}, -1$
- $-\frac{x_2}{x_1}, -1$
- $-\frac{1}{x_1}, -\frac{1}{2}$
- $-\frac{x_2+1}{x_1}, -\frac{3}{2}$

Solution for Exercise 9.

$$b, c$$

Solution for Exercise 10.





Solution for Exercise 11.

$$U(c, h) = c + \frac{h}{10000}$$

2 Solutions for Chapter 5

Solution for Exercise 1.

1. Yes.
2. No.
3. Yes.
4. Yes.

Solution for Exercise 2.

$(2, 2)$

Solution for Exercise 3.

$u(2, 2) = 4, u(1, 3) = u(3, 1) = 3$. Thus $(2, 2) \succsim (3, 1)$ and $(2, 2) \succsim (1, 3)$.

Solution for Exercise 4.

$(2, 0) \sim (0, 2)$ since $\max\{2, 0\} = \max\{0, 2\} = 2$ however $(2, 0) \succ (1, 1)$ and $(0, 2) \succ (1, 1)$ since $\max\{1, 1\} = 1$.

Solution for Exercise 5.

A and B.

Solution for Exercise 6.

Preferences over ice cream and broccoli for someone who does not like broccoli. They would strictly prefer less broccoli.

Solution for Exercise 7.

Imagine an athlete who wants to win a gold medal in any event. They can spend time practicing

tennis t and time practicing horseback riding h . They would rather spend all of there time on one or the other sport. Spending time on a mixture of sports will leave them less competitive at both.

3 Solutions for Chapter 6

Solution for Exercise 1.

- -1 . They would be willing to give up one unit of x_2 to get a unit of x_1 .
- $-\frac{1}{2}$. They have to give up half a unit of x_2 to get a unit of x_1 .
- If they are willing to give up one but only have to give up a half unit of x_2 , they will always be willing to do this until they have no x_2 left. Thus, they will end up consuming only x_1 .
- $(60, 0)$

Solution for Exercise 2.

1. 24
2. 150
3. 87

Solution for Exercise 3.

1. $x_1 = x_2$
2. $x_1 + 2x_2 = 60$
3. $(20, 20)$

Solution for Exercise 4.

$(60, 0)$

Solution for Exercise 5.

1. $-\frac{x_2}{x_1}$
2. $-\frac{1}{2}$
3. $-\frac{x_2}{x_1} = -\frac{1}{2}$
4. $(30, 15)$
5. Utility of all x_1 or all x_2 is zero while utility of $(30, 15)$ is $30 * 15 = 450$

6. $(30, 15)$

Solution for Exercise 6.

1. $2w + 2h = 20$
2. $(5, 5)$

Solution for Exercise 7.

1. $-\frac{x_1}{x_2}$
2. $-\frac{1}{2}$
3. $-\frac{x_1}{x_2} = -\frac{1}{2}$
4. $(12, 24)$
5. Utility of all x_1 is $60^2 = 3600$. Utility of all x_2 is $30^2 = 900$. Utility of $(12, 24)$ is 720
6. $(60, 0)$

Solution for Exercise 8.

1. $(30, 15)$
2. See chapter 1 exercise 8.
3. $(35, \frac{35}{2})$

Solution for Exercise 9.

1. $\ln(x_1) + \ln(x_2) + \ln(x_3) - \lambda(x_1 + x_2 + 2x_3 - 60)$
2. $\frac{1}{x_1} = \lambda, \frac{1}{x_2} = \lambda, \frac{1}{x_3} = 2\lambda, x_1 + x_2 + 2x_3 - 60 = 0$
3. $(20, 20, 10)$

Solution for Exercise 10.

1. 120
2. 150
3. 135
4. $(0, 30)$

Solution for Exercise 11.

$(15, 15, 15)$

Solution for Exercise 12.

$(60, 0, 0)$

Solution for Exercise 13.

$(15, 45)$

Solution for Exercise 14.

$(20, 40)$

4 Solutions for Chapter 7

Solution for Exercise 1.

1. Normal
2. Ordinary
3. Complement

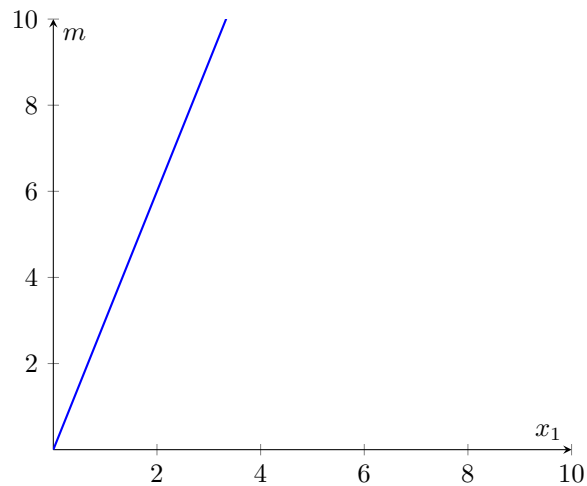
Solution for Exercise 2.

$$x_1 = \frac{m}{p_1 + 2p_2}, x_2 = 2 \frac{m}{p_1 + 2p_2}$$

Solution for Exercise 3.

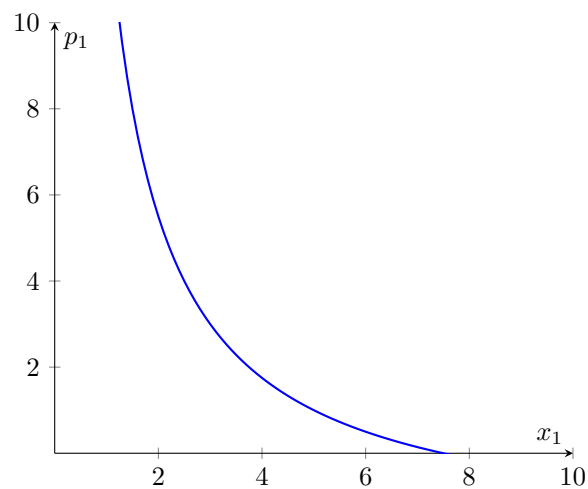
- Normal
- Ordinary
- Complement

Solution for Exercise 4.



Solution for Exercise 5.

$$p_1 = \frac{15}{x_1} - 2$$



Solution for Exercise 6.

$$x_1 = \frac{\frac{1}{3}m}{p_1}, x_2 = \frac{\frac{2}{3}m}{p_2}$$

Solution for Exercise 7.

- Normal.
- Ordinary.
- Neither

Solution for Exercise 8.

$$\left(\frac{p_2}{p_1}, -\frac{p_2 - m}{p_2} \right)$$

Solution for Exercise 9.

- $\frac{m}{p_1} > 2\frac{m}{p_2}, \left(\frac{m}{p_1}, 0 \right)$
- $2\frac{m}{p_2} > \frac{m}{p_1}, \left(0, \frac{m}{p_2} \right)$
- $\frac{m}{p_1} = 2\frac{m}{p_2}$