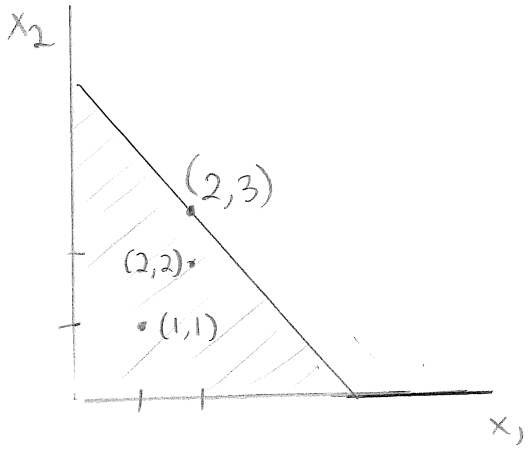
Chapter 1

1. (1,1) (2,2) (2,3)



2. Slope is steeper: give up more x_2 for extra x_1

3. For example: $x_1 + x_2 = 10$

4. Decrease in the price of x.

5. Decrease in the Price of x.

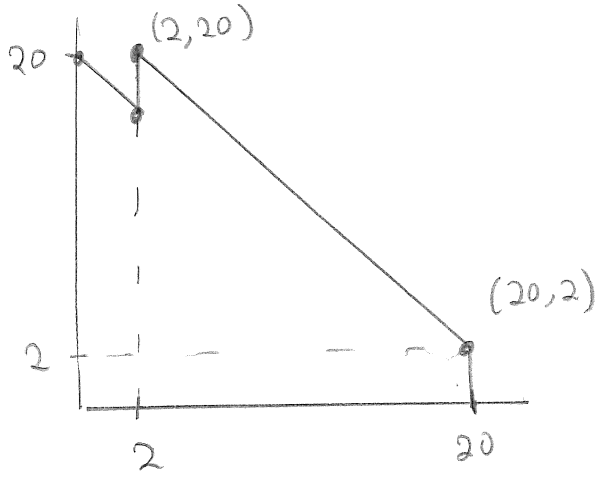
6. $x_1 + 2x_2 = 10$

✓ ✗ ✓
(2,3) (1,5) (2,4)

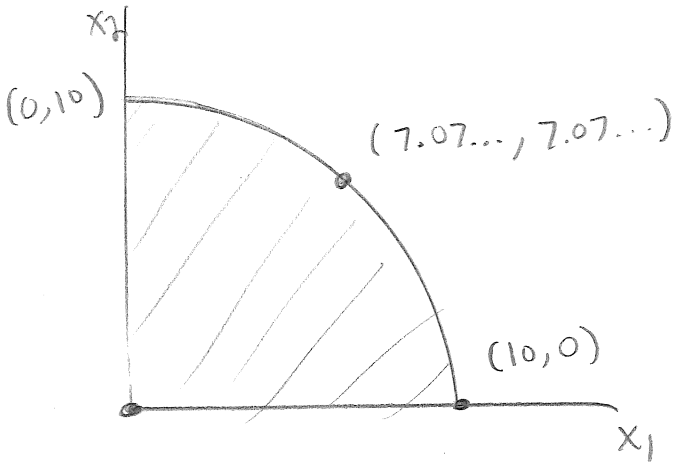
✗ ✗ ✓
(2,3) (1,5) (2,4)

7. After buying 3 units of x, they are 50% - off.

8.



9. $\sqrt{x_1^2 + x_2^2} \leq 10$



Chapter 2

1. (1). R, C, T.

   (2). T, A.

   (3). R, T, S

   (4). R, S

   (5). R, T, S

   (6). R, C, T

   (7). T, A

   (8). R, C, T

2. (1) At least as old in years.

   (2) Lives on same Planet As.

   (3) could beat in Tennis.

3. No! RbS SbP PbR

   If it was transitive there would be a strategy that always wins!

4. GRB BRR GRR

   aRb bRa bRc cRb

   eRb eRg bRg

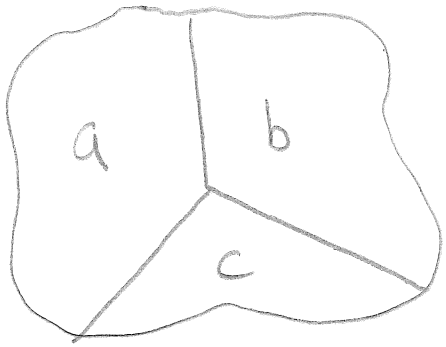
5. (1) $\not\subset$, $\top$

(2) $\subset$, $\not\top$

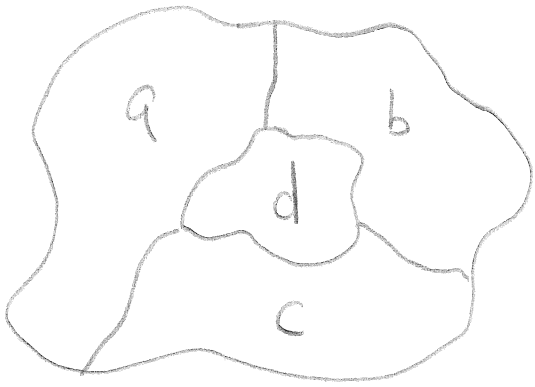
(3) $\subset$, $\top$

(4) $\subset$, $\not\top$

6.

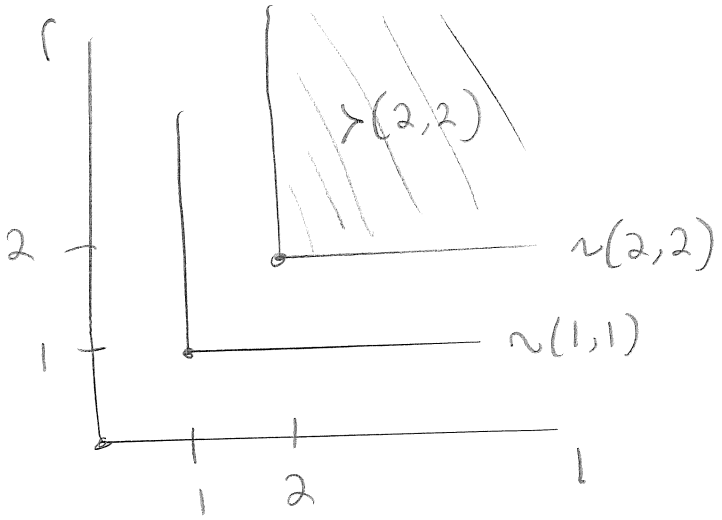


7.

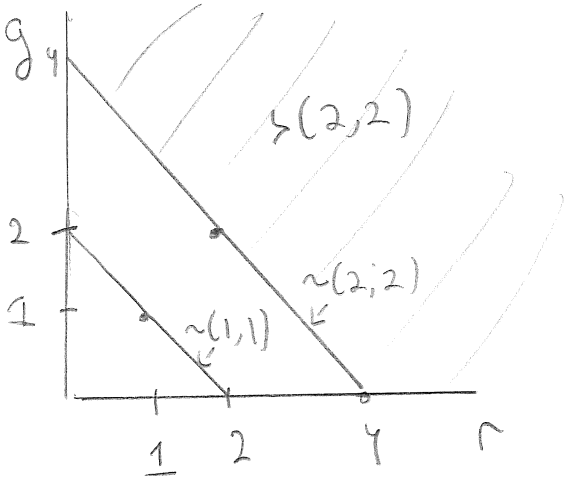


Chapter 3.

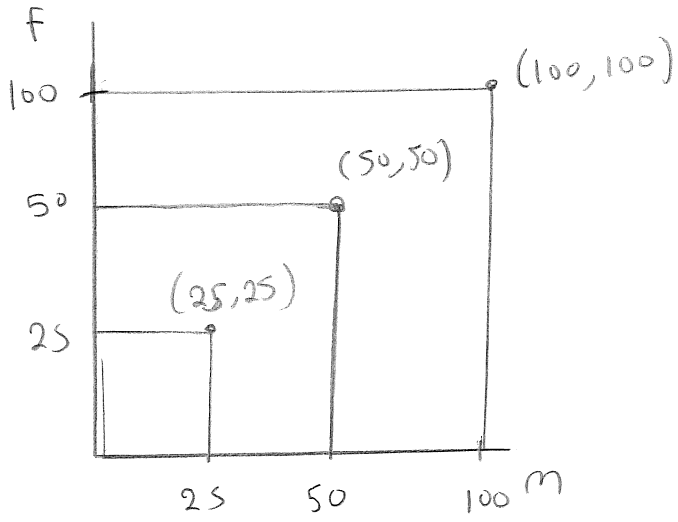
1.



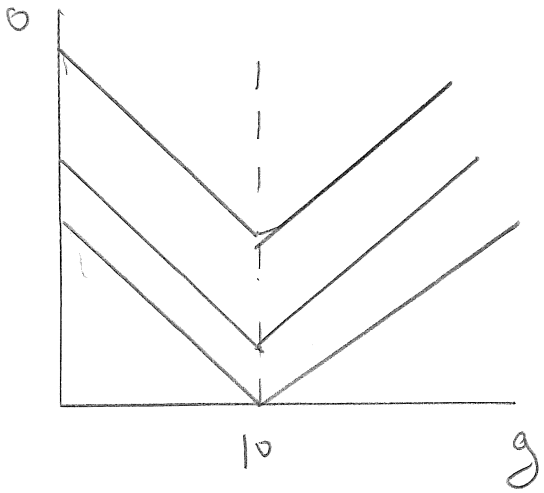
2.



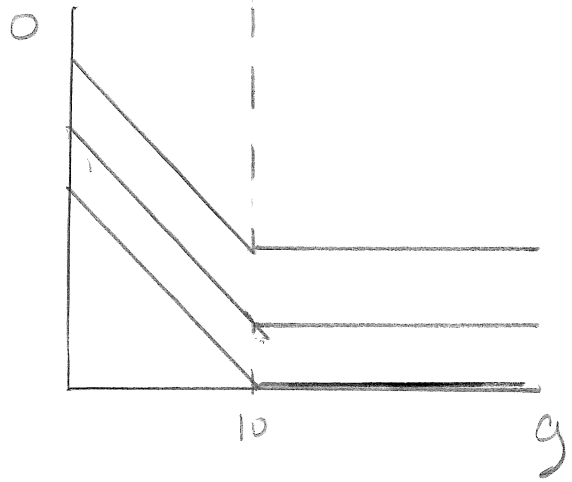
3.



4.



5.



6. (1) $a \sim b \sim c$

(2) $a \sim b \succ c$

(3) $a \succ b \sim c \succ d$

7. $P \succ Q$ $P \succ R$ $Q \succ R$

None.

8. (1) $P \sim P$ $Q \sim Q$ $R \sim R$

(2) $P \sim P$ $Q \sim Q$ $R \sim R$ $P \sim Q$ $P \sim R$ $Q \sim R$
$Q \sim P$ $R \sim P$ $R \sim Q$

9. (1) $\{c\}$

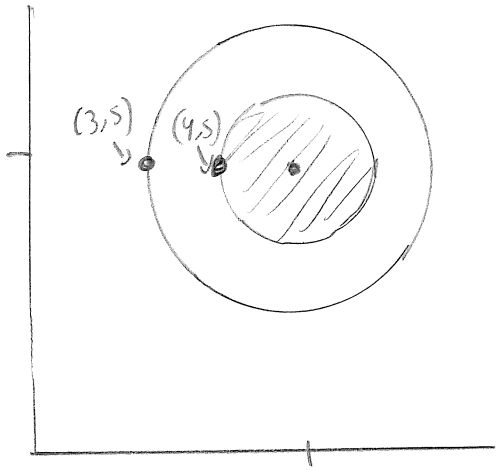
(2) $\{b, c\}$

(3) C

10. Yes. Complete.

Yes. Transitive.

11.



12. $(3, 400) \prec (4, 800)$

$(4, 400) \prec (4, 800)$

$(2, 900) \succ (2, 900)$

$(2, 800) \succ (2, 700)$

$(2, 400) \succ (1, 800)$