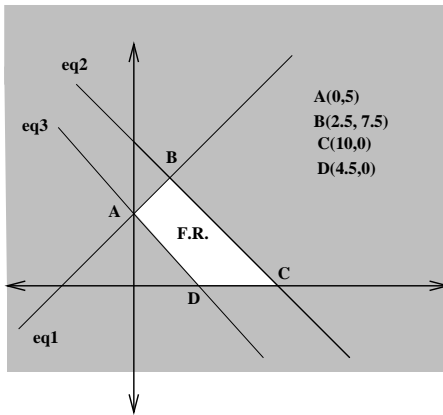


Solutions to Sample problems 2.

1. feasible region labeled F.R.



2. max at (2.5, 7.5) maximum value is 25.

3. min at (4.5, 0) minimum value is 4.5.

4.  $x$  = the number of batches of Vanilla  
 $y$  = the number of batches of Mocha  
 $z$  = the number of batches of Strawberry

$$\max P = 3x + 2y + 4z$$

constraints:

$$2x + y + z \leq 220$$

$$x + y + 2z \leq 120$$

$$2x + 2y + 2z \leq 200$$

$$z \leq 10$$

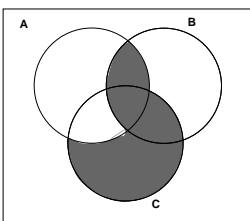
$$x \geq 0, y \geq 0, z \geq 0$$

5. The answers are listed in column form.

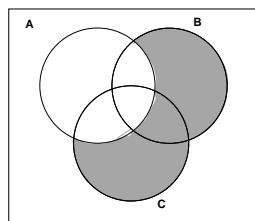
F	F	T
T	F	F
T	T	F
F	F	F

6. (a)  $\emptyset, \{a\}, \{b\}, \{c\}, \{a, b\}, \{a, c\}, \{c, b\}$ , and A.  
 (b)  $\emptyset, \{a\}, \{b\}, \{c\}, \{a, b\}, \{a, c\}, \{c, b\}$   
 (c) any two of the subsets above such that their intersection is empty.

7. part a)



part b)

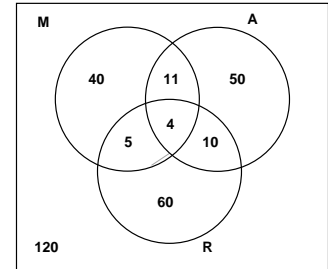


8. (a)  $(A \cap B^C \cap C^C) \cup (B \cap A^C \cap C^C)$   
 (b)  $(A^C \cap C) \cup (B^C \cap C) = (A^C \cup B^C) \cap C = (A \cap B)^C \cap C$

9. (a)  $\{1, 2, 4, 6, 7, 8\}$   
 (b)  $\{2, 4, 8\}$   
 (c)  $\{3, 5, 9\}$

10. see the solutions for the on-line suggest homework for these answers.

11. (a) figure to the side  
 (b) 150  
 (c) 221  
 (d) 19  
 (e) 110  
 (f) 105



12. 3  
 13. (a) 17576000  
 (b) 12167000  
 (c) 12164000  
 14.  $53 \frac{1}{3}$  minutes  
 15. (a) 15504 (b) 1860480  
 16. (a) 126  
 (b) 21  
 (c) 70  
 17. 336  
 18. (a) 12 (b) 198 (c) 100  
 19. 64,864,800  
 20. (a)  $S = \{(1, h), (1, t), (2, h), (2, t), (3, h), (3, t), (4, h), (4, t)\}$   
 (b) no they are not mutually exclusive since  $(2, h)$  is in both E and F.  
 (c) Any two subsets of S that are disjoint.