A = {RRR, LLL, SSS};

B = {RLS, RSL, LRS, LSR, SRL, SLR}

c. C = {RRL, RRS, LRR, SRR, RSR, RLR}

d. D = {RRL, RRS, LRR, SRR, RSR, RLR, LLR, LLS, RLL, SLL, LSL, LRL, SSL, SSR, SRS, SLS, LSS, RSS}

e. D' = {RRR, LLL, SSS, RLS, RSL, LRS, LSR, SRL, SLR}

C ∪ D = D

C ∩ D = C

4. a. S = {FFFF, FFFV, FFVF, FFVV, FVFF, FVFV, FVVV, FVVF, VFFF, VFFV, VFVF, VFVV, VVFV, VVFF, VVVV}

b. FFFV, FFVF, FVFF, VFFF

c. FFFF, VVVV

d. FFFF, FFFV, FFVF, FVFF, VFFF

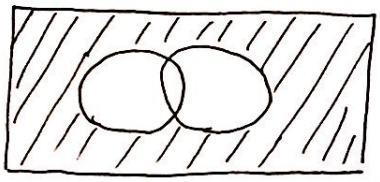
e. union : FFFF, VVVV, FFFV, FFVF, FVFF, VFFF

intersection : FFFF

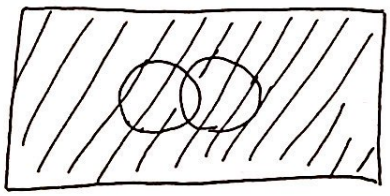
f. union : FFFF, VVVV, FFFV, FFVF, VFFF, FVFF

intersection : empty set.

9. a.



b.



2.2.12. a. $P(A \cup B) = P(A) + P(B) - P(A \cap B)$

$= 0.5 + 0.4 - 0.25$

$= 0.65$

b. $P(A' \cap B') = P[(A \cup B)'] = 1 - P(A \cup B)$

$= 1 - 0.65$

$= 0.35$

c. $P(A \cap B') = P(A) - P(A \cap B)$

$= 0.5 - 0.25$

$= 0.25$

$+\left(\frac{11}{15}\times\frac{4}{14}\right)$

$= \frac{44}{210} + \frac{44}{210}$

$= \frac{44}{105}$

27. a. $P(\{A, B\}) = \frac{1}{10}$

b. $P(\{$ start with at least one C $\}) = P(\{A, Cox\} + \{A, Cr\} + \{B, Cox\} + \{B, Cr\} + \{Cox, Cr\} + \{Cox, F\} + \{Cr, F\})$

$= \frac{7}{10}$

c. $P(\{$ at least 15 years experience $\}) = P(\{3,14\} + \{6,10\} + \{6,14\} + \{7,10\} + \{7,14\} + \{10,14\})$

$= \frac{6}{10}$

2.3. 30. a. $P_{3,8} = \frac{8!}{(8-3)!} = 8 \cdot 7 \cdot 6 = 336$

b. $C_{6,30} = \binom{30}{6} = \frac{30!}{6!(30-6)!} = \frac{30!}{6!\,24!} = 593775$

c. $C_{2,8} = \frac{8!}{2!(8-2)!} = 28$

$C_{2,10} = \frac{10!}{2!(10-2)!} = 45$

$C_{2,12} = \frac{12!}{2!(12-2)!} = 66$

$28 \cdot 45 \cdot 66 = 83160$

d. $\frac{83160}{593775} = 0.14$

e. $P(\{$ All vines bottles are same $\}) = P(\{$ all are zinfandel $\}) + P(\{$ all are merlot $\}) + P(\{$ all are cabernet $\})$

$= \binom{8}{6} + \binom{10}{6} + \binom{12}{6}$

$= 28 + 210 + 924$

$= 1162$

$\frac{1162}{593775} = 0.002$

38. a. Total number of ways to select three bulbs = $C(15,3) = 455$

Number of ways to select two 75-w bulbs = $C(6,2) \times C(9,1) = 135$

$\frac{135}{455} = 0.297$

b. Number of ways to select three bulbs of the same rating:

$C(4,3) + C(5,3) + C(6,3) = 4 + 10 + 20 = 34$

$\frac{34}{455} = 0.0747$

c. $C(4,1) \times C(5,1) \times C(6,1) = 4 \times 5 \times 6 = 120$

$\frac{120}{455} = 0.264$

d. $1 - \frac{6}{15} - \frac{9}{15} \times \frac{6}{14} - \frac{9 \cdot 8}{15 \cdot 14} \times \frac{6}{13} - \frac{9 \cdot 8 \cdot 7}{15 \cdot 14 \cdot 13} \times \frac{6}{12} - \frac{9 \cdot 8 \cdot 7 \cdot 6}{15 \cdot 14 \cdot 13 \cdot 12} \times \frac{6}{11}$

$= 1 - 0.958$

$= 0.042$

40. a. The total number of possible chain molecules is $12! = 479\,001\,600$.

$\frac{12!}{3!3!3!3!} = 369600$

b. $P(4,4) = 4! = 24$

$\frac{24}{369600} = 0.00006494$