Solutions to review problems:

1. a. Define event N: the item is non-defective. P(N) = 0.4(0.92) + 0.6(0.90) = 0.908

b. Use Bayes' theorem: P(I/D) = 0.032/0.092 = 0.348

2. No, two events that are independent are not necessarily mutually exclusive. For example, consider the experiment of drawing one card at random from a deck. Define the events F: the card is a face card and let H: the card is a heart. These two events are independent, since P(F/H) = P(F) (show this with the actual probabilities!) but they are not mutually exclusive, since the intersection of the two events is nonempty.

3. Suggestion: construct a table

	Women	Men	**Total**
Yes	24	37	**61**
No	17	22	**39**
Total	**41**	**59**	**100**

a. Define events W : the person selected is a woman, Y: person answers "yes": $P(W \cap Y) = 24/100$

b. $P(W/Y) = 24/61$

c. A man is more likely (just compute P(Y/M) and P(Y/W)).

d. No they are not independent since P(W/Y) is not equal to P(W).

e. No they are not mutually exclusive because the intersection of the two events is nonempty.

(there was no problem 4)

5. Use the multinomial coefficient; there are nine letters, but two of them appear twice each. So the number of different codes is $\dfrac{9!}{2!\,2!} = 90720.$

6. **Solution 1:** Choose two from the 9 for the park, choose 4 from the remaining 7 for the driving patrol, then choose 3 from the last 3 for the town hall: $\binom{9}{2} \cdot \binom{7}{4} \cdot \binom{3}{3}$

Solution 2: use the multinomial: $\binom{9}{2,4,3} = \frac{9!}{2!\,4!\,3!}$.

Verify that the two solutions are the same.

7. a. ${}_{15}P_3$

b. P (one experienced and two new employees) = $\frac{\binom{6}{1}\binom{9}{2}}{\binom{15}{3}}$.