**Applied Finite Mathematics**
**Probability Graded Assignment Solutions**

66. There are 2 choices for each topping—put it on or leave it off. Thus there are $2^6 = 64$ possible pizzas.

70. a. A sample space $S$ for this random experiment might be taken to consist of all ways that 3 balls could be selected from the 10 in the urn (*without* regard to order). That is $N = {}_{10}C_3 = 120$. The number of outcomes in the event that two balls drawn are blue and one is red is ${}_3C_2 \times {}_7C_1 = 21$. So, Pr(two are blue and one is red) $= \frac{21}{120} = \frac{7}{40}$.

b. In this random experiment, each draw is an independent event. So, we can multiply the probabilities of each event. Pr(only first and third balls are blue) $= \frac{3}{10} \times \frac{7}{10} \times \frac{3}{10} = \frac{63}{1000}$.

c. A sample space $S$ for this random experiment might be taken to consist of all ways that 3 balls could be selected from the 10 in the urn (*with* regard to order). That is $N = {}_{10}P_3 = 720$. The number of outcomes in the event that only the first and third balls drawn are blue (making the second ball drawn red) is ${}_3P_2 \times {}_7P_1 = 42$. So, Pr(first and third balls are blue) $= \frac{42}{720} = \frac{7}{120}$.

74. Pr(all 5 same suit) $= \frac{4 \times {}_{13}C_5}{2{,}598{,}960} = \frac{33}{16.660} \approx 0.00198$

The total number of 5-card draw poker hands is ${}_{52}C_5 = 2{,}598{,}960$. The number of hands with all 5 cards the same color is $4 \times {}_{13}C_5 = \frac{4\times13\times12\times11\times10\times9}{5!} = 5148$. The numberator represents the 4 ways to choose the suit times the number of (unordered) ways to choose 5 cards from the 13 cards of the chosen suit.

78. a. $(1 - 0.02)^{12} = (0.98)^{12} \approx 0.78$. We are assuming that the events are independent.

b. Pr(at most 1 defective) = Pr(none defective) + Pr(1 defective)

$$= (0.98)^{12} + 12(0.98)^{11}(0.02)$$

$$\approx 0.98$$

80. If $N$ is odd, the probability is 0 (there can't be the same number of $H$'s as $T$'s). If $N$ is even, say $N = 2K$, then the probability is ${}_NC_K \left(\frac{1}{2}\right)^N = \frac{N!}{2^N K!K!} = \frac{(2K)!}{2^N K!K!}$.