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6.45 Fight one big battle: His probability of winning is 0.6, which is higher than the probability $0.8^3 = 0.512$ of winning all three small battles.

6.46 The probability that all 12 chips in a car will work is $(1-0.05)^{12} = (0.95)^{12} \doteq 0.5404$.

6.47 No: It is unlikely that these events are independent. In particular, it is reasonable to expect that college graduates are less likely to be laborers or operators.

6.48 (a) $P(A) = \frac{7,317}{16,639} \doteq 0.4397$ or about 0.44, since there are 7,317 (thousand) males out of 16,639 (thousand) students in the October 2003 CPS. (b) $P(B) = \frac{3,494 + 2,630}{16,639} = \frac{6,124}{16,639} \doteq 0.3681$. (c) $P(A \cap B) = \frac{1,589 + 970}{16,639} = \frac{2,559}{16,639} \doteq 0.1538$; A and B are not independent since $P(A \cap B) \neq P(A) \times P(B)$.

6.49 An individual light remains lit for 3 years with probability $1 - 0.02$; the whole string remains lit with probability $(1-0.02)^{20} = (0.98)^{20} \doteq 0.6676$.

6.50 P(neither test is positive) = $(1 - 0.9)\times(1 - 0.8) = 0.1\times0.2 = 0.02$.

6.51 (a) P(one call does not reach a person) = 0.8. Thus, P(none of the 5 calls reaches a person) = $(0.8)^5 \doteq 0.3277$. (b) P(one call to NYC does not reach a person) = 0.92. Thus, P(none of the 5 calls to NYC reaches a person) = $(0.92)^5 \doteq 0.6591$.

6.52 (a) There are six arrangements of the digits 1, 2, and 3: {123, 132, 213, 231, 312, 321}, so $P(winning) = \frac{6}{1000} = 0.006$. (b) With the digits 1, 1, and 2, there are only three distinct arrangements {112, 121, 211}, so $P(winning) = \frac{3}{1000} = 0.003$.