3.2.12 The probability of any shell hitting the bunker is 30/500 = 0.06. The probability of exactly k shells hitting the bunker is $p(k) = \binom{25}{k}(0.06)^k(0.94)^{25-k}$. The probability the bunker is destroyed is $1 - p(0) - p(1) - p(2) = 0.187$.

3.2.18 Use the hypergeometric model with $N = 12$, $n = 5$, $r = 4$, and $w = 12 - 4 = 8$. The probability that the committee will contain two accountants ($k = 2$) is

$$\frac{\binom{4}{2}\binom{8}{3}}{\binom{12}{5}} = 14/33$$

3.2.4 (a) The probability that exactly four circuit boards need rework is

$$\binom{12}{4}(0.15)^4(0.85)^8 = 0.068$$

(b) P(At least one needs rework) = 1 – P(None need rework)

$$= 1 - \binom{12}{0}(0.15)^0(0.85)^{12} = 1 - 0.142 = 0.858$$

3.3.2 (a) There are $5 \times 5 = 25$ total outcomes. The set of outcomes leading to a maximum of k is $(X = k) = \{(j, k) \mid 1 \leq j \leq k - 1\} \cup \{(k, j) \mid 1 \leq j \leq k - 1\} \cup \{(k, k\}$, which has $2(k - 1) + 1 = 2k - 1$ elements. Thus, $p_X(k) = (2k - 1)/25$

(b)

Outcomes	V = sum of two nos.
(1, 1)	2
(1, 2) (2, 1)	3
(1, 3) (2, 2) (3, 1)	4
(1, 4) (2, 3) (3, 2) (4, 1)	5
(1, 5) (2, 4) (3, 3) (4, 2) (5, 1)	6
(2, 5) (3, 4) (4, ,3) (5, 2)	7
(3, 5) (4, 4), (5, 3)	8
(4, 5) (5, 4)	9
(5, 5)	10

$p_V(k) = (k - 1)/25$ for $k = 1, 2, 3, 4, 5, 6$ and $p_V(k) = (11 - k)/25$

3.3.4 $p_X(1) = 6/6^3 = 6/216 = 1/36$

$p_X(2) = 3(6)(5)/6^3 = 90/216 = 15/36$

$p_X(3) = (6)(5)(4)/6^3 = 120/216 = 20/36$