7.5 Solution: $f(x,y) = (1/3)^2 = 1/9$ where $-3/2 \leq x \leq 3/2, -3/2 \leq y \leq 3/2$, so

$$E[|X| + |Y|] = \frac{1}{9}\int_{-3/2}^{3/2}\int_{-3/2}^{3/2}(|x| + |y|)dxdy = 3/2$$

7.6 Solution:

$$E[\sum_i d_i] = \sum_i E[d_i] = 10 \cdot 7/2 = 35$$

7.7 Solution:

(a)

$$p(A \text{ and } B) = (3/10)^2 = 9/100$$

(b)

$$p(\text{not } A \text{ and not } B) = (7/10)^2 = 49/100$$

(c)

$$p(xor) = 1 - 9/100 - 49/100 = 42/100 = 21/50$$

7.8 Solution:

$$E[X] = E[\sum_i X_i] = \sum_i E[X_i] = \sum_i (1-p)^{i-1}$$

7.11 Solution:

$$E[X] = E[\sum_i X_i] = \sum_i E[X_i] = \sum_{i=2}^{n} 2(1-p)p = 2(n-1)(1-p)p$$

7.19 Solution:

(a)

$$E[First] - 1 = \frac{1}{P_i} - 1$$

(b)

$$E[X] = E[\sum_{j\neq 1} X_j] = \sum_{j\neq 1} E[X_j] = \sum_{j\neq 1} P_j/(P_j + P_1)$$

7.21 Solution:

(a)

$$E[X] = 365E[X_i] = 365\binom{100}{3}(1/365)^3(364/365)^{97}$$

(b)

$$E[X] = \sum_{i=1}^{100} E[X_i] = 365[1 - (364/365)^{100}]$$