2.79 (a) 0.018;
   (b) 0.22 + 0.002 + 0.160 + 0.102 + 0.046 + 0.084 = 0.614;
   (c) 0.102/0.614 = 0.166;
   (d) \frac{0.102+0.046}{0.175+0.134} = 0.479.

2.85 Consider the events:
A: the doctor makes a correct diagnosis,
B: the patient sues.
\[ P(A^c \cap B) = P(A^c)P(B \mid A^c) = (0.3)(0.9) = 0.27. \]

2.88 Consider the events:
F: failed the test,
P: passed the test.

(a) \[ P(\text{failed at least one tests}) = 1 - P(P_1P_2P_3P_4) = 1 - (0.99)(0.97)(0.98)(0.99) = 1 - 0.93 = 0.07, \]
(b) \[ P(\text{failed 2 or 3}) = 1 - P(P_2P_3) = 1 - (0.97)(0.98) = 0.0494. \]
(c) \[ 100 \times 0.07 = 7. \]
(d) 0.25.

2.90 (a) \[ P(A \cap B \cap C) = P(C \mid A \cap B)P(B \mid A)P(A) = (0.20)(0.75)(0.3) = 0.045. \]
(b) \[ P(B^c \cap C) = P(A \cap B^c \cap C) \]
\[ + P(A^c \cap B \cap C) = P(C \mid A \cap B^c)P(B^c \mid A)P(A) + P(C \mid A^c \cap B \cap C) \]
\[ = (0.80)(1 - 0.75)(0.3) + (0.90)(1 - 0.20)(1 - 0.3) = 0.564. \]
(c) Use similar argument as in (a) and (b), \[ P(C) = P(A \cap B \cap C) + P(A \cap B^c \cap C) + P(A^c \cap B \cap C) \]
\[ + P(A^c \cap B^c \cap C) = 0.045 + 0.060 + 0.021 + 0.504 = 0.630. \]
(d) \[ P(A \mid B^c \cap C) = P(A \cap B^c \cap C) / P(B^c \cap C) = (0.06)(0.564) = 0.1064. \]

2.92 \[ P = (0.95)[1 - (1 - (0.7)(1 - 0.8))(0.9)] = 0.8037. \]

2.93 This is a parallel system of two series subsystems.

(a) \[ P = 1 - [1 - (0.7)(0.7)][1 - (0.8)(0.8)] = 0.75112. \]
(b) \[ P = \frac{P(A \cap C \cap D \cap E)}{P_{\text{system works}}} = \frac{(0.3)(0.8)(0.8)(0.8)}{0.75112} = 0.2045. \]

2.96 Let \( S_1, S_2, S_3, \) and \( S_4 \) represent the events that a person is speeding as he passes through the respective locations and let \( R \) represent the event that the radar traps is operating resulting in a speeding ticket. Then the probability that he receives a speeding ticket:
\[ P(R) = \sum_{i=1}^{4} P(R \mid S_i)P(S_i) = (0.4)(0.2) + (0.3)(0.1) + (0.2)(0.5) + (0.3)(0.2) = 0.27. \]

2.98 \[ P(S_2 \mid R) = \frac{P(R \cap S_2)}{P(R)} = \frac{0.08}{0.27} = 1/9. \]

2.101 Consider the events:
A: a customer purchases latex paint,
A': a customer purchases semigloss paint,
B: a customer purchases rollers,
\[ P(A \mid B) = \frac{P(B \mid A)P(A)}{P(B \mid A)P(A) + P(B \mid A')P(A')} = \frac{(0.60)(0.75)}{(0.60)(0.75) + (0.25)(0.30)} = 0.857. \]