2.7 $1-P(A)-P(B)+P(A\cap B)=(a+b+c+d)-(a+b)-(a+c)+a=d$
$$=P(A'\cap B')$$

2.8 $P[(A\cap B')\cup(A'\cap B)]=b+c=(a+b)+a+c)-2a$
$$=P(A)+P(B)-2P(A\cap B)$$ Refer to Figure 2.6

2.9 **(a)** $P(A)+P(B)-P(A\cap B)\geq 0\rightarrow P(A\cap B)\leq P(A)+P(B)$

(b) $P(A)+P(B)-P(A\cap B)\leq 1$ $\quad P(A\cap B)\geq P(A)+P(B)-1$

2.15 $\frac{p}{1-p}=\frac{A}{B}$, $pb=A-Ap$, $PA+pB=A$, $p(A+B)=A$, $p=\frac{A}{A+B}$

2.17 **(a)** $P(A|B)=\frac{P(A\cap B)}{P(B)}\geq 0;$ **(b)** $P(B|B)=\frac{P(B\cap B)}{P(B)}=\frac{P(B)}{P(B)}=1$

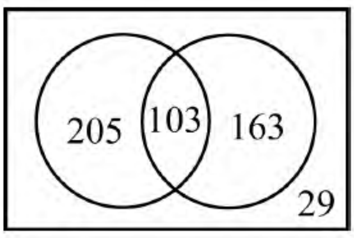
(c) $$P(A_1\cup A_2\cup\ldots|B)=\frac{P[A_1\cup A_2\cup\ldots)\cap B]}{P(B)}$$
$$=\frac{P(A_1\cap B)}{P(B)}+\frac{P(A_2\cap B)}{P(B)}+\cdots$$
$$=P(A_1|B)+P(A_2|B)+\cdots$$

2.39 **(a)** House has fewer than three baths;
(b) does not have fire place;
(c) does not cost more than \$200,000
(d) is not new;
(e) has three or more baths and fire place;
(f) has three more baths and costs more than \$200,000
(g) costs more than \$200,000 but has no fire place;
(h) is new or costs more than \$200,000
(i) is new or costs \$200,000 or less
(j) has 3 or more baths and/or fire place;
(k) has 3 or more baths and/or costs more than \$200,000;
(l) is new and costs more than \$200,000

2.43 $3,\ x_1 3,\ x_1x_2 3,\ x_1x_2x_3 3,\ldots$ where $x_1=1,2,4,5,6,$ for all i

(a) 5^{k-1}; **(b)** $1+5+\ldots 5^k=\frac{5^k-1}{4}$

2.50 $500-(308+266)+103=29\neq 59$ results are *in*consistent



2.54 **(a)** $1-0.37=0.63$; **(b)** $1-0.44=0.56$; **(c)** $0.37+0.44=0.81$;
(d) 0; **(e)** 0.37, $P(A\cap B')=P(A)$ for mutually exclusive events;
(f) $1-0.81=0.19$

2.55 **(a)** Probability cannot be negative.
(b) $0.77+0.08=0.85\neq 0.95$
(c) $0.12+0.25+0.36+0.14+0.09+0.07=1.03>1$
(d) $0.08+0.21+0.29+0.40=0.98<1$

2.60 $$\frac{\binom{16}{2}}{\binom{52}{2}}=\frac{120}{1326}=\frac{20}{221}$$

2.63 **(a)** $$\frac{\binom{6}{2}\binom{5}{2}\binom{3}{2}\cdot 4}{6^5}=\frac{15\cdot 10\cdot 3\cdot 4}{6\cdot 6\cdot 6\cdot 6\cdot 6}=\frac{25}{108}$$

(b) $$\frac{6\binom{5}{3}\cdot 5\cdot 4}{6^5}=\frac{6\cdot 10\cdot 5\cdot 4}{6\cdot 6\cdot 6\cdot 6\cdot 6}=\frac{25\cdot 4}{648}=\frac{25}{162}$$

(c) $$\frac{6\cdot 5\binom{5}{3}\binom{2}{2}}{6^5}=\frac{6\cdot 5\cdot 10}{6\cdot 6\cdot 6\cdot 6\cdot 6}=\frac{25}{648}$$

(d) $$\frac{6\binom{5}{4}\cdot 5}{6^5}=\frac{6\cdot 5\cdot 5}{6\cdot 6\cdot 6\cdot 6\cdot 6}=\frac{25}{1296}$$