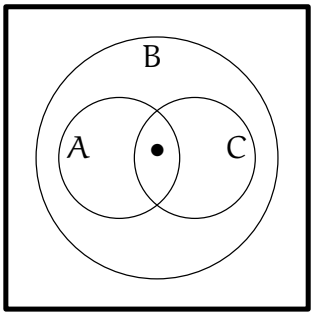
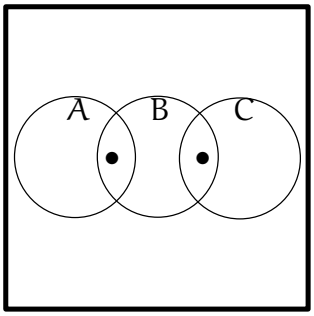
1. Exercise set 5.3

†6:

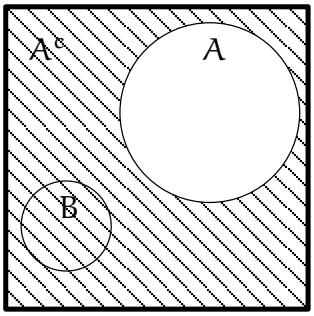


b.



c.

11:



22: (References (.) to Theorem 5.2.2 and [.] to Theorem 5.3.3)

$$A - (A - B) \overset{(10)}{=} A \cap (A \cap B^c)^c \overset{(7,5)}{=} A \cap (A^c \cup B)$$
$$\overset{(3)}{=} (A \cap A^c) \cup (A \cap B) \overset{[2]}{=} \emptyset \cup (A \cap B) \overset{[1]}{=} (A \cap B)$$

24: (References (.) to Theorem 5.2.2 and [.] to Theorem 5.3.3)

$$(A \cup B) - B \overset{(10)}{=} (A \cup B) \cap B^c \overset{(3)}{=} (A \cap B^c) \cup (B \cap B^c)$$
$$\overset{(10)}{=} (A - B) \cup (B \cap B^c) \overset{[2]}{=} (A - B) \cup \emptyset \overset{[1]}{=} (A - B)$$

†27: (References (.) to Theorem 5.2.2 and [.] to Theorem 5.3.3)

$$(A - (A \cap B)) \cap (B - (A \cap B)) \overset{(10)}{=} (A \cap (A \cap B)^c) \cap (B \cap (A \cap B)^c)$$
$$\overbrace{= \cdots =}^{(1,2,6)} (A \cap B) \cap (A \cap B)^c \overset{[2]}{=} \emptyset$$

35: b. yes. c. no (4 appears twice.) e. yes.

†38: Yes. It follows from the Quotient-Remainder Theorem that each integer belongs to one and only one of the given sets.

40: d. In the book.

2. Exercise set 6.1

†5: b. (i) $\{HTT, THT, TTH\}$, probability $3/8$. (ii) $\{THH, HTH, HHT, HHH\}$, probability $4/8 = 1/2$. (iii) $\{TTT\}$, probability $1/8$.

3. Exercise set 6.2

14: e. $26 \cdot 10 \cdot 9 \cdot 8 = 18720$.

30: a. $6! = 720$. b. $5! = 120$. c. $3! = 6$.

33: abc, abd, acb, acd, adb, adc, bac, bad, bca, bcd, bda, bdc, cab, cad, cba, cbd, cda, cdb, dab, dac, dba, dbc, dca, dcb.

36: d. $7 \cdot 6 \cdot 5 = 210$.

†39:

$$\begin{aligned} P(n+1,3) - P(n,3) &= (n+1)n(n-1) - n(n-1)(n-2) \\ &= ((n+1) - (n-2))\overbrace{n(n-1)}^{P(n,2)} = 3P(n,2) \end{aligned}$$

4. Exercise set 6.3

†10: b. $5! + 5! = 240$.

22: a. $\lfloor 1000/2 \rfloor = 500$ are multiples of 2, $\lfloor 1000/9 \rfloor = 111$ are multiples of 9, and $\lfloor 1000/18 \rfloor = 55$ are multiples of 18 (i.e. of 2 *and* 9). Therefore, the multiples of 2 *or* 9 are $500 + 111 - 55 = 556$.
b. $556/1000 = 139/250$.
c. $1000 - 556 = 444$.