6.1.5

Once at Denver, I have 6 choices of flights to get to San Francisco from which I have an independent choice of 7 more flights to get to New York. Therefore there are $6 \cdot 7 = 42$ ways for me to get to New York from Denver.

6.1.7

There are 26 choices for each letter meaning there are $26^3 = 17576$ three letter initials.

6.1.9

There is only 1 choice for the the first letter (the letter A) and then 26 choices for each remaining initial, hence there are $1 \cdot 26^2 = 676$ such initials.

6.1.23

a) $\lfloor \frac{999}{7} \rfloor - \lceil \frac{100}{7} \rceil + 1 = 128$

b) $(999 - 100 + 1) - \left(\lfloor \frac{999}{7} \rfloor - \lceil \frac{100}{7} \rceil + 1\right) = 450$

c) $\frac{999}{111} = 9$

d) $(999 - 100 + 1) - \left(\lfloor \frac{999}{4} \rfloor - \lceil \frac{100}{4} \rceil + 1\right) = 900 - (249 - 25 + 1) = 675$

e) By the inclusion exclusion principle,

$$\left[\left\lfloor \frac{999}{3} \right\rfloor - \left\lceil \frac{100}{3} \right\rceil + 1\right] + \left[\left\lfloor \frac{999}{4} \right\rfloor - \left\lceil \frac{100}{4} \right\rceil + 1\right] - \left[\left\lfloor \frac{999}{12} \right\rfloor - \left\lceil \frac{100}{12} \right\rceil + 1\right] = 450.$$

f) $(999 - 100 + 1) - 450 = 450$

g) $\left[\lfloor \frac{999}{3} \rfloor - \lceil \frac{100}{3} \rceil + 1\right] - \left[\lfloor \frac{999}{12} \rfloor - \lceil \frac{100}{12} \rceil + 1\right] = 225$

h) $\left[\lfloor \frac{999}{12} \rfloor - \lceil \frac{100}{12} \rceil + 1\right] = 75$

6.1.27

There are 3 choices of representative for each of the 50 states, hence 3^{50} choices.

6.1.29

There are $26^2 \cdot 10^4 + 10^2 \cdot 26^4 = 52,457,600$ such license plates.

6.1.33

a) $(26-5)^8 = 37,822,859,361$

b) $\frac{21!}{(21-8)!} = 8,204,716,800$

c) $5 \cdot 26^7 = 40,159,050,880$

d) $5 \cdot \frac{25!}{(25-7)!} = 12,113,640,000$

e) $26^8 - 21^8 = 171,004,205,215$

f) $8 \cdot 5 \cdot 21^7 = 72,043,541,640$

g) $26^7 - 21^7 = 6,230,721,635$

h) $26^6 - 21^6 = 223,149,655$

6.1.35

a) There are none

b) $5! = 120$

c) $\frac{6!}{(6-5)!} = 6! = 720$

d) $\frac{7!}{(7-5)!} = 2520$

6.3.1

$$\begin{array}{ccc} \{a,b,c\} & \{b,a,c\} & \{c,a,b\} \\ \{c,b,a\} & \{b,c,a\} & \{a,c,b\} \end{array}$$

6.3.3

There are $6! = 720$ permutations.

6.3.5

a) $P(6,3) = \frac{6!}{3!} = 120$

b) $P(6,5) = 6! = 720$

c) $P(8,1) = 8$

d) $P(8,5) = 8(7)(6)(5)(4) = 6720$

e) $P(8,8) = 8! = 40,320$

f) $P(10,9) = 10! = 3,628,800$

6.3.9

a) $C(5,1) = 5$

b) $C(5,3) = \frac{5(4)(3)}{3!} = 10$

6.3.13

6.3.17

6.3.21

6.3.23

6.3.29