Exercise-set 1.
Solutions

1. a) $26^5 - 26$,
   b) $7!/(2! \cdot 3!)$,
   c) $\binom{29}{5}$,
   d) $5 \cdot 25 \cdot 24 \cdot 23 \cdot 22$,
   e) $\binom{25}{4} = \binom{26}{5} - \binom{25}{5}$,
   f) $26^5 - 25^5$,
   g) $\binom{25}{5} + \binom{24}{4}$,
   h) $\binom{26}{9}$,
   i) $\sum_{k=0}^{26} \binom{26}{k} = 2^{26}$.

2. a) 5^{25},
   b) $\binom{24}{20}$.

3. a) $\binom{30}{6}$,
   b) $\binom{35}{6}$,
   c) $\binom{100}{4}$.

4. $\binom{30}{4}^{16}$.

5. a) $\binom{\binom{90}{5}}{20}$,
   b) $\binom{\binom{90}{5}+19}{20}$
   c) $\binom{\binom{89}{4}}{7} \cdot \binom{\binom{89}{5}}{13}$,
   d) $\binom{\binom{89}{5}+\binom{88}{3}}{20}$.

6. $\binom{\binom{26}{3}}{4}$.

7. a) $\binom{20}{4} \cdot (\binom{20}{4} - 1) \cdot (\binom{20}{4} - 2)$.
   b) $\binom{20}{4} \cdot (\binom{20}{4} - 1) \cdot (\binom{20}{4} - 2) - \binom{19}{4} \cdot (\binom{19}{4} - 1) \cdot (\binom{19}{4} - 2)$.
   c) $3 \cdot \binom{19}{3} \cdot \binom{19}{4} \cdot (\binom{19}{4} - 1)$.

8. $26 \cdot 25 \cdot 24 \cdot 23 \cdot 4^5$.

9. $6 \cdot \binom{5}{3} \cdot 11!/(3! \cdot (2!)^3)$.

10. $\binom{15}{3} \cdot \binom{12}{4} \cdot 2^4$.

11. $\binom{12}{4} \cdot \binom{8}{3} \cdot 24^5$.

12. $\binom{5}{5} \cdot \binom{5}{0} + \binom{5}{4} \cdot \binom{5}{1} + \binom{5}{3} \cdot \binom{5}{2} = \binom{10}{5}/2$.

13. $26^6 + \binom{6}{1} \cdot 26^5 \cdot 10 + \binom{6}{2} \cdot 26^4 \cdot 10^2$.

14. $\binom{6}{3} \cdot 26^3 \cdot 10^3 - 4 \cdot 26 \cdot 10^3$.

15. $1 \cdot \binom{6}{2} \cdot 9^4 + 8 \cdot \binom{6}{3} \cdot 9^3$

16. a), b) The numbers of even and odd subsets are equal (see ex. 19/a).

17. 2^{100}.

18. a) 100,
    b) 100
    c) 36.

19. a) 0,
    b) $\binom{100}{10}$.