1. **Solution of ex5 pp50:**
   The sample space is given by
   \[ S = \{ (\omega_1, \omega_2, \omega_3, \omega_4, \omega_5), \ \omega_i = 0, 1, \ i = 1, \ldots, 5 \}. \]
   
   (a) Hence the number of outcomes in the sample space is \( 2 \times 2 \times 2 \times 2 \times 2 = 2^5 = 32. \)
   
   (b) The event \( W \) is given by
   \[
   W = \{(1, 1, 1, 1, 1), (1, 1, 1, 1, 0), (1, 1, 1, 0, 1), (1, 1, 0, 1, 1), (1, 1, 0, 1, 0),  \]
   \[ (1, 1, 0, 0, 1), (1, 1, 0, 0, 0), (1, 0, 1, 1, 1), (0, 1, 1, 1, 1) \]
   \[ (1, 0, 1, 1, 0), (0, 1, 1, 1, 0), (0, 0, 1, 1, 1), (0, 0, 1, 1, 0), (1, 0, 1, 0, 1) \].
   
   (c) The event \( A \) is given by
   \[ A = \{ (\omega_1, \omega_2, \omega_3, 0, 0), \ \omega_i = 0, 1, \ i = 1, \ldots, 3 \}. \]
   Hence, the number of outcomes is \( 2^3 = 8. \)
   
   (d) \( A \cap W = \{(1, 1, 1, 0, 0), (1, 1, 0, 0, 0)\}. \)

2. **Solution of ex10 pp51:**
   Let us denote by \( R \) and \( N \) the events, respectively, that the student wears a ring and wears a necklace. Now, we know that
   \[ P(N^c \cap R^c) = 0.6, \ P(R) = 0.2, \ P(N) = 0.3. \]
   
   Hence
   
   (a) \( P(N \cup R) = 1 - P(N^c \cap R^c) = 1 - 0.6 = 0.4 \)
   
   (b) \( P(N \cap R) = P(R) + P(N) - P(N \cup R) = 0.2 + 0.3 - 0.4 = 0.1 \)

3. **Solution of ex12 pp51:**
   Let us denote by \( S \) the event that a student is taking a Spanish class, by \( F \) the event that a student is taking a French class and by \( G \) the event that a student is taking a German class. Then we have the following proportions: \( P(S) = 28/100, P(F) = 26/100, P(G) = 16/100, P(S \cap F) = 12/100, P(S \cap G) = 4/100, P(F \cap G) = 6/100, P(S \cap F \cap G) = 2/100. \)
(a) The probability that he or she is not in any of the language classes is equal to
\[ P[(S \cap F \cap G)^c] = 1 - P(S \cup F \cup G). \]
On the other side, using a formula for the union of three events, we get that
\[ P(S \cup F \cup G) = P(S) + P(F) + P(G) - P(S \cap F) - P(S \cap G) - P(F \cap G) + P(S \cap F \cap G) = 0.5. \]
Hence \[ P[(S \cap F \cap G)^c] = 0.5 \]

(b) They are 28 students that are taking Spanish, among them 12 are taking French and 4 are taking German and 2 are taking German and French, hence they are 14 that are taking only Spanish. Hence, \[ P(S \cap F^c \cap G^c) = \frac{14}{100}. \]
They are 26 students that are taking French, among them 12 are taking Spanish and 6 are taking German and 2 are taking German and French, hence they are 10 that are taking only French. Hence, \[ P(F \cap S^c \cap G^c) = \frac{10}{100}. \]
They are 16 students that are taking German, among them 4 are taking Spanish and 6 are taking French and 2 are taking also German and Spanish, hence they are 8 that are taking only French. Hence, \[ P(F^c \cap S^c \cap G^c) = \frac{8}{100}. \]
Hence
\[ P(1 \text{ language}) = P(S \cap F^c \cap G^c) + P(F \cap S^c \cap G^c) + P(F^c \cap S^c \cap G^c) = \frac{32}{100}. \]

(c) Let us denote by \( E \) the event that no one of the chosen two students is taking a language class. Hence, \( P(E^c) = 1 - P(E) \). On the other side, we have 100 students among them 50 are taking at least a language class and 50 are not. Hence
\[ P(E) = \frac{n(E)}{100} = \frac{C^2_{50}}{C^2_{100}} = \frac{49}{198}. \]
Hence \( P(E^c) = 1 - \frac{49}{198} = \frac{149}{198} \).