Answers to Exercise 1:

Answer keys:

- 1. **Three-digit numbers:** Answer: 6^3 (Each digit can be any of the 6 digits)
  2. **Three different digits:** Answer: $6 \times 5 \times 4$ (6 for the first, 5 for the second and 4 for the last)
  3. **Six different digits:** Answer: 6! (All digits must be used)
- **Four digits:**
  1. First digit is odd: Answer: 3×6^3 (3 choices for the first digit, any of the 6 for the rest)
  2. First digit is odd and last is even: Answer: $3^2 \times 6^2$ (3 choices for the first digit, 3 for the last, any of the 6 for the middle two)
  3. Odd and even digits alternate: Answer: 2×3^4 (Choose odd/even or even/odd digits alternately)

Answers to Exercise 2:

1. Seven-Digit Phone Numbers:
   - Each digit: 0 to 9 (10 options).
   - Total combinations: $10^7 = 10,000,000$.
2. The Algerian phone number structure consists of ten digits, with the first digit being 0 (1 option), the second digit being either 5, 6, or 7 (3 options), and the remaining eight digits ranging from 0 to 9 (10 options each). This results in a total of $1 \times 3 \times 10^8 = 300,000,000$ possible combinations. Given the population of approximately 45 million, the available phone numbers are sufficient to cover the entire population.

Answers to Exercise 3:

To determine how many 6-place license plates can be formed with the first 3 places occupied by letters and the final 3 places by numbers, consider the following cases:

1. **Repetition of letters and numbers allowed:** Total combinations $= 26^3 \times 10^3$.
2. **No repetition of letters allowed:** Total combinations $= 26 \times 25 \times 24 \times 10^3$.
3. **No repetition of numbers allowed:** Total combinations $= 26^3 \times 10 \times 9 \times 8$.
4. **No repetition of both numbers and letters allowed:** Total combinations $= 26 \times 25 \times 24 \times 10 \times 9 \times 8$.
5. **First two letters are DZ:** Total combinations $= 1 \times 1 \times 24 \times 10^3$.
6. **Last number is 9:** Total combinations $= 26^3 \times 10^2$.

Answers to Exercise 4:

A committee of 4 is to be formed from a group of 20 people (13 boys and 7 girls).

1. **Total different committees possible:** The number of ways to choose 4 people from 20 is given by the combination formula $\binom{n}{r}$:
$$\text{Total Committees} = \binom{20}{4} = \frac{20!}{4!(20-4)!}.$$
2. **Committees consisting of 3 boys and 1 girl:** The number of ways to choose 3 boys from 13 and 1 girl from 7:
$$\text{Committees (3 boys, 1 girl)} = \binom{13}{3} \times \binom{7}{1} = \frac{13!}{3!(13-3)!} \times \frac{7!}{1!(7-1)!}.$$