Exercise 1. How many numbers are there between 100 and 1000 that are
(a) divisible by 3?
(b) divisible by 5?
(c) divisible by 15?

Exercise 2. Prove that $(A \setminus B) \cup (B \setminus A) = (A \cup B) \setminus (A \cap B)$
(a) using Venn diagrams,
*(b) without Venn diagrams.

Exercise 3. Let $\Sigma = \{a, b, c\}$ and $\Phi = \{a, c, e\}$.
(a) How many words are in the set $\Sigma^2$?
(b) What are the elements of $\Sigma^2 \setminus \Phi^*$?
(c) Is it true that $\Sigma^* \setminus \Phi^* = (\Sigma \setminus \Phi)^*$? Why?

Exercise 4. Recall the algorithm for computing the gcd of two positive numbers$^1$:
\[
gcd(m, n) = \begin{cases} 
m & \text{if } m = n \\
gcd(m - n, n) & \text{if } m > n \\
gcd(m, n - m) & \text{if } m < n \end{cases}
\]
Recall the correctness proof given in class. What needs to change to adapt it to the potentially faster version below?
\[
gcd(m, n) = \begin{cases} 
m & \text{if } m = n \\
gcd(m \mod n, n) & \text{if } m > n \\
gcd(m, n \mod m) & \text{if } m < n \end{cases}
\]

---

$^1$The way it’s defined here works for positive numbers only.