# 1 Simple Stuff

Prerequisites: control flow (branching, iteration), IO, arithmetic, atomic types.

## 1.1 Equation of a Line ⋆

**Input:** Two integers $k$ and $b$.

**Output:** Such value $x$, that it satisfies the equation $kx + b = 0$.

## 1.2 Wait, what? ⋆⋆

**Input:** Two integers $a$ and $b$.

**Output:** The product of $a$ and $b$.

**Note:** You may not use the multiplication operation.

## 1.3 Late'o'clock ⋆⋆

**Input:** An integer $0 \leq h < 24$. Hours on a clock.

**Note:** Convert the given time $h$ to the 12-hour clock format.

**Output:** First the time $h$ in 12-hour clock format, then `"am"` or `"pm"` depending on the time.

## 1.4 Quadratic Equation ⋆⋆

**Input:** Three integers $a$, $b$ and $c$.

**Output:** Find all values of $x$, such that $ax^2 + bx + c = 0$.

**Note:** If there are no possible values of $x$ output `"NaN"` (not a number). The values should not be repeated.

## 1.5 Qubic Equation ⋆⋆⋆

**Input:** Four integers $a$, $b$, $c$ and $d$.

**Output:** Find all values of $x$, such that $ax^3 + bx^2 + cx + d = 0$.

**Note:** If there are no possible values of $x$ output `"NaN"` (not a number). The values should not be repeated.

**Hint:** use Cardano's formula.

### 1.6 Minmaxed ⋆

**Input:** Two integers, $a$ and $b$.

**Output:** Two integers, first the largest of them two, next the smallest.

### 1.7 Sigma for Sum ⋆⋆

**Input:** An integer $a$ such that $1 \leq a \leq 10^{10^{10}}$.

**Output:** The sum all the integers $1 + 2 + \ldots + a$.

**Hint:** Loop isn't the only way to go.

### 1.8 Factor!al ⋆⋆⋆

**Input:** An integer $a$ such that $1 \leq b \leq 10^5$.

**Output:** The product all the integers $1 \times 2 \times \cdots \times b$.

**Hint:** Lookup the arguments for `range` in the official Python3.x documentation.

### 1.9 Minmaxed 2: The Sequel ⋆⋆⋆

**Input:** Two integers, $a$ and $b$.

**Output:** Two integers, first the largest of them two, next the smallest.

**Note:** You may only use `min()` or `max()`, not both. You may not use branching.

## 2 Turtle or Tortoise?

Prerequisites: `turtle` module, the entire previous section.

### 2.1 Fair Square ⋆

**Input:** An integer $A$ such that $10 \leq A \leq 100$.

**Output:** Using `from turtle import Turtle`'s methods like `forward` and `right` draw a square of length $A$.

## 2.2 Fair Ngon ⋆⋆

**Input:** Two integers, $A$ such that $10 \leq A \leq 100$ and $N$ such that $2 \leq N \leq 20$.

**Output:** Using `Turtle` draw a regular polygon (an $N$-gon) with $N$ sides and side length $A$. Ensure that the turtle finishes in the same position as it started in. The turtle shouldn't draw over itself at any point.

**Hint:** Loops are your friend.

## 2.3 Trigonometry BFF ⋆⋆⋆

**Input:** Two integers, $a$ and $b$.

**Output:** Using `Turtle` draw a graph of the function $y = a * sin(\frac{\pi x}{10}) + b$. From 0 to 20 and a graph of the function $y = b$. Print the final position of the turtle.

**Hint:** You can get sin and $\pi$ with `from math import pi, sin`, they are accurate enough for this purpose.

## 2.4 The Fair Ngon ⋆⋆⋆⋆⋆

**Input:** Two integers, $A$ such that $10 \leq A \leq 100$ and $N$ such that $2 \leq N \leq 20$.

**Output:** Using `Turtle` draw a regular polygon (an $N$-gon) with $N$ sides and side length $A$. Ensure that the turtle finishes in the same position as it started in. You are only allowed to control the turtle with `penup`, `pendown`, `goto`.

**Hint:** Trigonometry might help.