Remember:

- Include team name.
- For math tasks, solve each one separately. The process of reasoning must be clear.
- Send your solutions to geomatical@gynome.cz before the end of January.
- The next set of tasks is headed your way in March.

We would like to stress the importance of submitting your answers to the geographical part in a digital format – especially the answers to task 3. Keep in mind that illegible, poorly photographed and/or otherwise deficient answers may not be awarded points.

Round 2

Geography

Europe's Climate

This round's focus is Europe's climate in 2018. Utilizing Copernicus data (climate.copernicus.eu) find answers to the following questions:

1. Cold Start to the Year (4 pts)

   Several episodes of extremely cold air during February and March made these two months the only ones of 2018 with below-average temperatures.

   Study the text (https://climate.copernicus.eu/cold-start-year) and decide if the following sentences are true or false. Give reasons for your answers.

   a) Throughout the whole month of February in 2018 the average surface temperature in Europe was lower than the 1981–2010 average.

   b) The number of frost days (days with a minimum temperature below 0 °C) in both the Czech Republic and Poland was more than twenty (each) in February 2018.

   c) Both Hungary and Bulgaria experienced more ice days (days with maximum temperature below 0 °C) in February 2018 compared to the average for the 1981–2010 period.

   d) The cause of the two cold waves in March 2018 was a depression above Scandinavia which pushed cold air to Central and Western Europe.

2. Dry and Warm Spring and Summer (4 pts)

   After the unusually cold February and March, Europe experienced an extensive warm period that lasted until the end of the year.

   Study the text (https://climate.copernicus.eu/dry-and-warm-spring-and-summer) and answer the following questions:

   a) In what years after 2000 was the surface temperature over the period of April to August in Central Europe higher than the 1981–2010 average by more than 1.5 °C?

b) From the following list, choose the countries which had no areas on their territory with total precipitation in summer 2018 higher than the average of the 1981–2010 period:
Czech Republic, Poland, Belarus, France, Germany, Hungary

c) From the following list, choose the areas which were drier in June 1976 than in June 2018:
western France, northern Italy, southern Sweden, central Poland, northern Portugal, Iceland

d) From the following list, choose the countries, where there were areas with more than 18 consecutive dry days (days with no more than 1 mm of rainfall) in July 2018:
Belgium, Czech Republic, Greece, Hungary, Netherlands, Romania, Slovakia, Sweden, Switzerland, United Kingdom

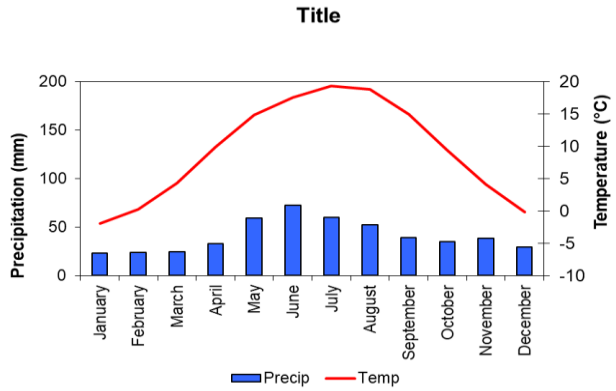
3. The Climate in Your Hometown (4 pts)

Focus on the weather in your hometown in 2018.

a) Find the nearest professional weather station to your town and use its data to complete the following table:

Weather station (incl. geographic location)**:**		
Month	**Avg. Monthly Temperature** (°C)	**Total Monthly Precipitation** (mm)
January		
February		
March		
April		
May		
June		
July		
September		
October		
November		
December		

b) Use a spreadsheet (MS Excel, Libre Office Math, etc.) and the data in your table to make a climograph for your local weather station. Use an overlapped combination of a bar and line chart using a red polygonal chain to represent the temperature and blue bars to visualize precipitation. Please submit the actual spreadsheet file – not just a snapshot of the graph.



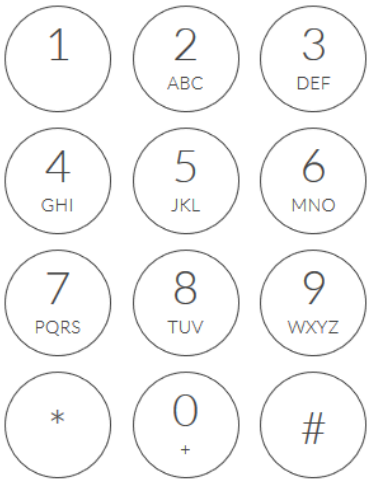
*Example climograph

c) Briefly interpret your climograph. Give account of the development of temperatures and precipitation in your town in 2018.

Maths

1. Mr Quickpace and Mr Sluggard set off for the same hike at the same time. Only Mr Quickpace's starting point was up on the mountain at the hotel Mr Sluggard was headed to from the bus stop down in town. They met each other at ten a.m. Two hours later, Mr Quickpace arrived at the bus stop, while Mr Sluggard, taking his time, went through the hotel door at six p.m. What time did the gentlemen set out – given they were both travelling at their respective constant speeds for the whole course of the journey?

2. This is Linda's phone's keypad:



Linda's best friend Judi's phone number has the following properties:

- it has nine digits,
- all the digits in the number are different,
- the first four digits are in an ascending order,
- centres of the keys representing the first four digits are vertices of a square,
- centres of the keys representing the last four digits are also vertices of a square,
- the number is divisible by three and five.

How many different nine-digit numbers could be Judy's phone number?

3. Prove that – for acceptable values of the variables – the following equality is true:

$$\frac{a^2\left(\frac{1}{b}-\frac{1}{c}\right)+b^2\left(\frac{1}{c}-\frac{1}{a}\right)+c^2\left(\frac{1}{a}-\frac{1}{b}\right)}{\frac{a}{bc}(c-b)+\frac{b}{ac}(a-c)+\frac{c}{ab}(b-a)}=a+b+c$$