

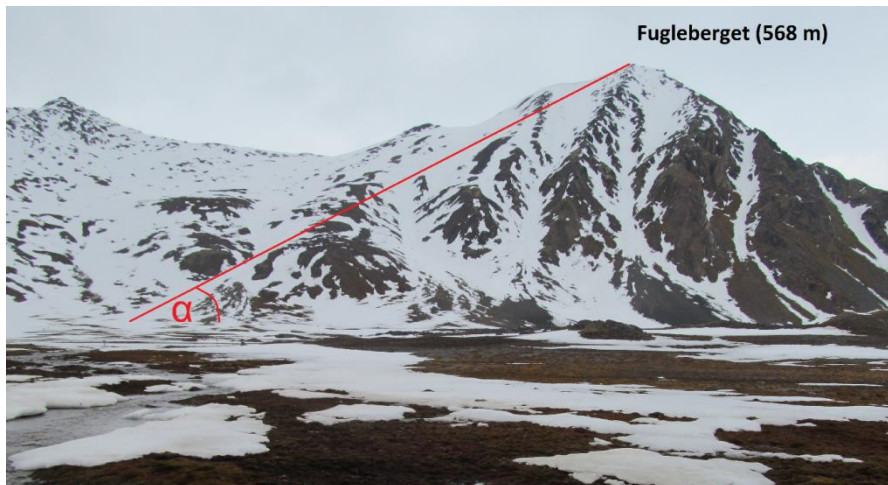
Mathematical tasks

WORKSHEET to lesson "Meteorological measurements in the Arctic"

Task 1. Meteorologist working at the Polish Polar Station Hornsund is responsible for replacing the batteries in the temperature and pressure logger located at the top of the Fugleberget mountain. His shape and weather conditions allow him to move uphill at a speed of $v_1 = 0,5 \text{ m/s}$.

a) Calculate how many minutes it will take to reach the destination if he starts at altitude of 18 m, the Fugleberget mountain height is 568 m a.s.l. and the average inclination of the slope is $\alpha = 30^\circ$.

b) How long will take the descent from the mountain if the velocity is $v_2 = 0,7 \text{ m/s}$?



Task 2. Tom plans to save money on the purchase of skis in December this year. For this purpose in January he put down 10 Euros and in each subsequent month from January through December inclusive, he wants to postpone by 8 Euros more than in the previous month. Parents have promised to donate 50% of his savings as a Christmas gift. Calculate how much money Tom will be able to spend on buying skis.



Task 3. Some scientist hired a student of glaciology as assistant in his project. The period of employment was twelve weeks. The student was offered one of two scholarship options:



- a) In the first week the student will earn only 2 Euros, but in each subsequent week her scholarship will be twice higher than in the previous one;
- b) In the first week the student will receive 500 Euros, and in each next will receive 5% more than in the previous week.

Guess which of the scholarships is more profitable for a student?

Calculate how much money the student will receive in each option.

Task 4. The length of the power cord of the ground temperature logger at 0°C is 50 m. When the temperature rises by 1°C , its length increases by 2 mm.

- a) Express the length of the power cord in meters as a function of the temperature in degrees Celsius.
- b) Calculate the length of the power cord at 15°C .
- c) At what temperature will the power cord be 10 cm longer than at 10°C ?