Task 1

Problem Statement

Green: Easy	Under 30°
Blue: Moderate	30° to under 45°
Black: Difficult	45° to under 60°

The Little Bear Mountain Ski Resort is a popular ski club, especially with snowboarders. Last weekend though, the resort had to shut down for three days because of a major storm. When the ski patrol went to check the ski paths after the blizzard, they couldn't find the rating signs that tell how difficult the paths are. They returned back to the base lodge to check the map on the computer. Unfortunately, the storm caused a power outage and the computer that had the files listing the steepness of each path was lost. All the ski patrol could find was a scale drawing of the mountain that outlines the paths and chairlifts and shows where the cabins and base lodge are. The length of each path is also on the map. Each centimeter represents 100m. John Smith, the head of the ski patrol was not worried. He said they had all the information they needed to find the steepness of each path (this would be the angle of elevation) using their trigonometry skills. The table shows the three ratings for the paths:
So if a path has a steepness of 40°, it gets a blue square sign posted at the top of the path.

Task 1

Using your trigonometric skills, calculate the steepness of each path by finding its angle of elevation. Write your calculations directly on the map and then show a summary of the results in the table.

Hints:

- Each space on the grid is a 1 cm square.
- You may construct segments to create triangles as needed.

Summary of Results:

Path	Steepness	Rating
Slow Sam		
Bobsled Bop		
Dare Devil Drop		
Avalanche Alley		
Thunder Run		

Task 2

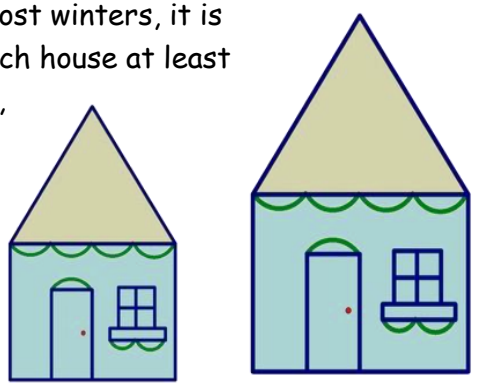
Trisha Timid has only started learning how to snowboard. She wants to go right to the top of the mountain and then find an easy way down. She thinks she can navigate Avalanche Alley, but doesn't want to risk going on Thunder Run. She is wondering if she could cut across to the top of Slow Sam (this would be from point E to point B on the map).

a) She wants to know how long this would be. How many meters is Trisha's path from the top of the mountain if she goes down Avalanche Alley, cuts across from point E to point B, and then goes down Slow Sam.

b) What rating would the path from E to B be? Explain how you know

Task 3

The owners of the resort, Juan and Maria Garcia want to expand their business by building a row of houses at the western base of the mountain. Because of the amount of snow the area gets most winters, it is important to have the pitch (steepness) of the roof of each house at least 60°. To make the houses appealing to skiers and boarders, the Garcia's want to model the houses after their cabins, but on a larger scale. The cabins have an A-line roof that forms an isosceles triangle as shown, with the base angles at 62°. The base length of the triangular roof of each cabin is 4m.



Slant height is length of the side of the roof.

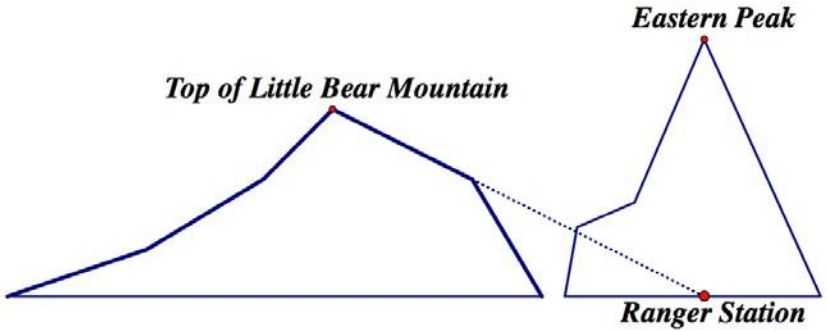
a) What is the slant height of the roof on the cabin (to the nearest tenth of a meter)?

b) The roofs of the houses to be built will have a base length of 7.4m. What will be the slant height of the roof on one of the houses?

Task 4

Little Bear Mountain has an altitude of 800m. The mountain to the east of Little Bear Mountain has a higher altitude. Arthur Benjamin was taking a break from skiing and was basking in the sun at the top of Little Bear Mountain. He wondered how much higher the eastern mountain was. He was able to see down to the Ranger Station at the bottom of Eastern Peak at an angle of depression of41° and look up to the top of Eastern peak at an angle of elevation of27°.

Find out how much higher Eastern Peak is (to the nearest tenth of a meter) than Little Bear Mountain. Use the sketch below to help you.



Criteria	1 Minimal	2 Partial	3 Sufficient	4 Deep
Conceptual Understanding	I didn't understand enough to get started or even make progress.	I understood enough to solve part of the problem or to get part of a solution.	I understood how the parts of the problem fit together and made partial sense of the problem before starting it.	I understood how the parts of the problem fit together and **made sense of the problem** before starting it.
Communicating Reasoning *Communicating logically*	I gave very little or no explanation of my reasoning. I used little or incorrect math vocabulary and/or notation. ***Sample evidence:***	I gave little explanation of my reasoning for the decisions I made in solving the problem and I used limited math vocabulary and notation. ***Sample evidence:***	I partially explained my reasoning for the decisions I made in solving the problem using at least one representation (written, graphic, pictorial or symbolic) and supported my explanation. I used some correct math vocabulary and notation throughout my explanation.	I **clearly** and **thoroughly explained** my reasoning for the decisions I made in solving the problem using a **variety of representations** (written, graphic, pictorial or symbolic) and **supported my explanation** in a **detailed** and **organized** way. I used **correct math vocabulary** and **notation** throughout my explanation.

Criteria	1 Minimal	2 Partial	3 Sufficient	4 Deep
Procedural Understanding *Strategic approach to problem-solving*	I presented no strategy or I used an inappropriate strategy.	I used an appropriate strategy; however, I made errors in several steps and may have little evidence of organization.	I used an appropriate strategy; however, I made minor errors in a few steps and organization may need improvement.	I used an **appropriate strategy**. All steps are fully presented and **well-organized**. ***Sample evidence:***
Correct Answer	I provided no final answer, an irrelevant answer, or an answer that is completely inaccurate. ***Sample evidence:***	I answered some questions correctly within the given context of the problem but had significant arithmetic errors.	I answered most questions correctly within the given context of the problem, but had minor arithmetic errors, or paid partial attention to precision.	I **answered all questions correctly** within the given context of the problem and **attended to precision** by using **accurate units** of measure, **labels** for axes on a coordinate plane, etc.

This is a map of the Little Bear Mountain Ski Resort for use in your task.