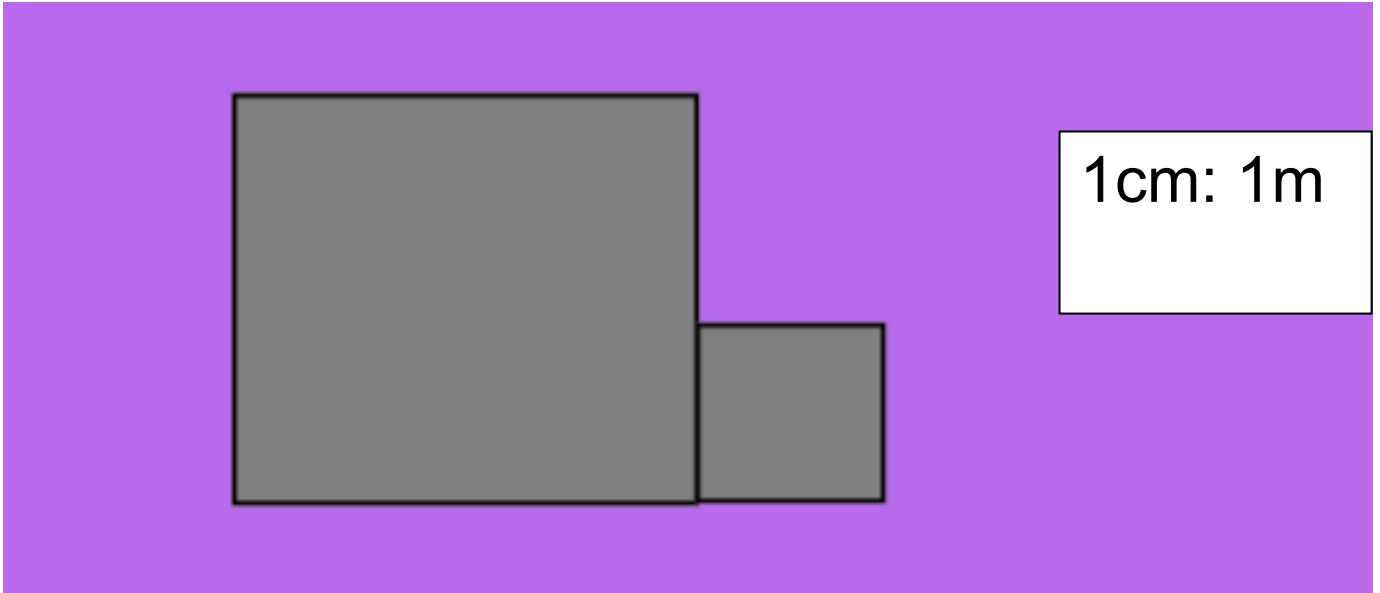


Booklet 2: Constructions

Problem A: Drainage canal

Below is a plan view of Amir's house and bathroom. He wants to dig a drainage canal around the perimeter of his house and bathroom to help prevent rainwater flooding which is increasing due to the effects of climate change. He wants the canal to be exactly 75cm from his house. Plot the drainage canal on the diagram.



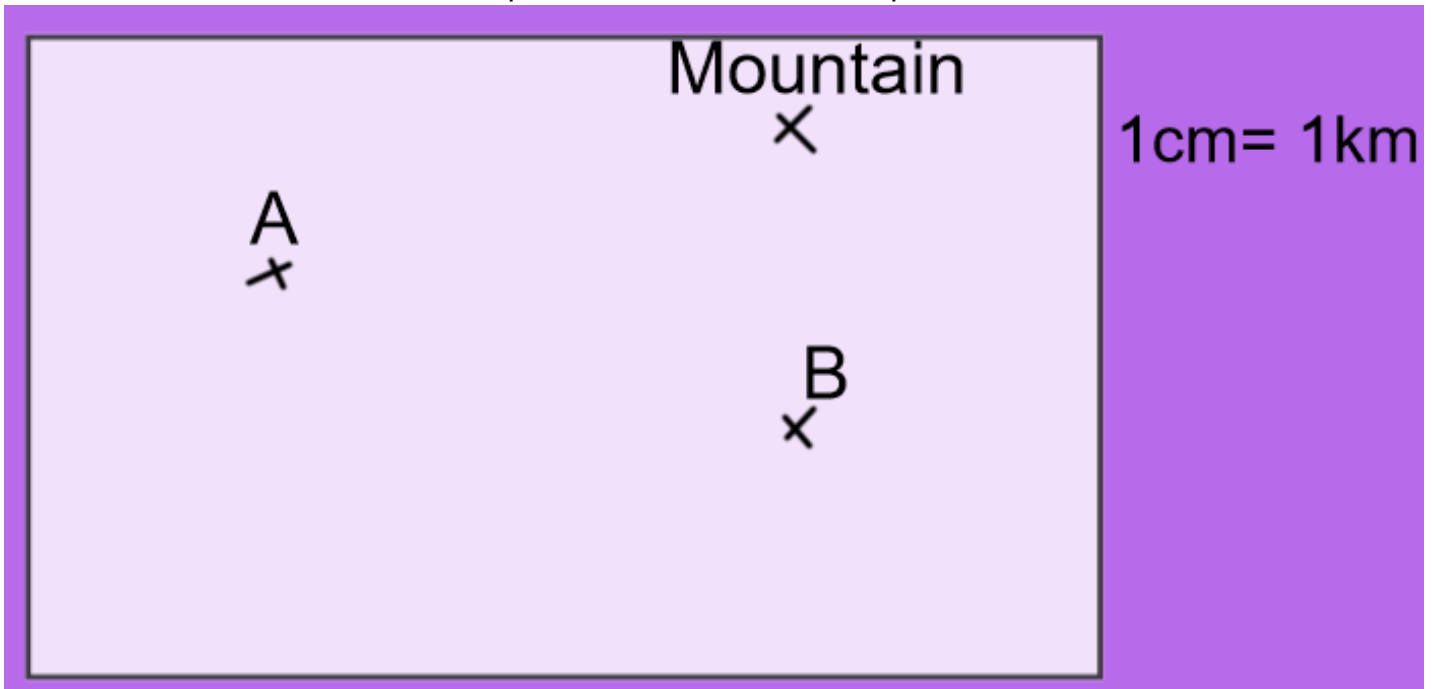
Problem B: Water tap

Cheru and Kamama live in separate villages in rural Kenya. Cheru lives in village A and Kamama lives in village B. Following severe droughts, water sources near each village have dried up and currently, their only source of water is 16km away and their only option is to walk there. A water charity has decided that they will dig a new bore hole and construct a water tap which will shorten the journey for both girls.

The people of both villages have requested that the water tap should be an equal distance from each village. The tap also needs to be within 2km of the mountain as this is the only area where

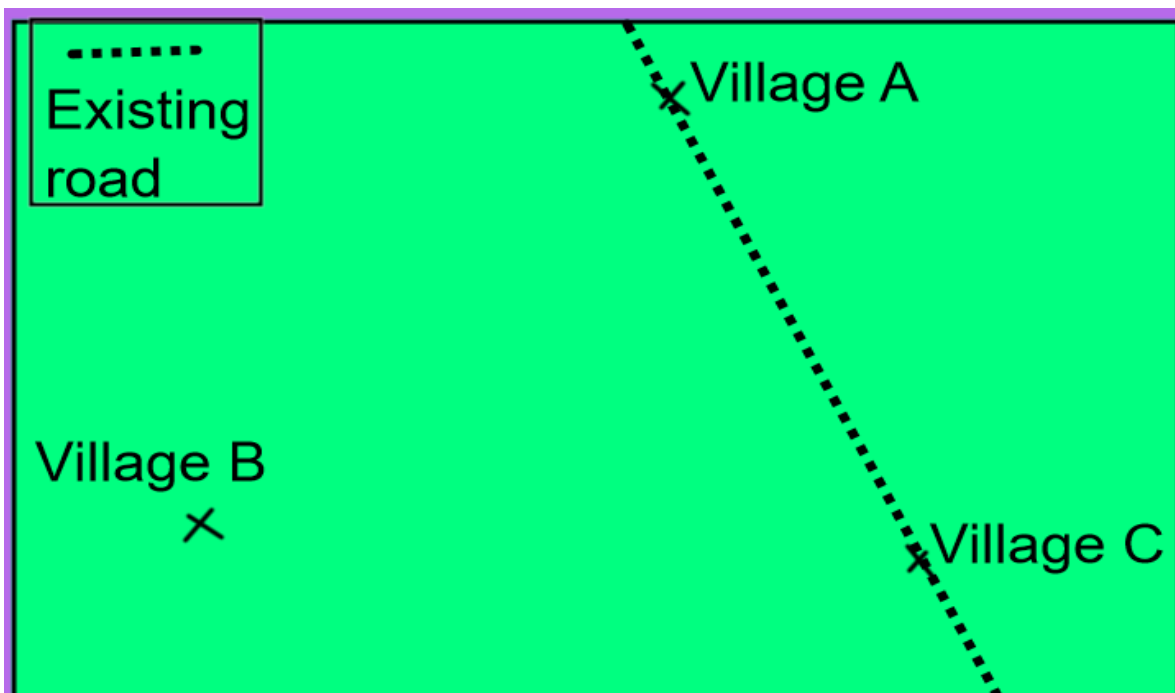
Booklet 2: Constructions

there is water to be found. Find the point where the new water point should be.



Problem C: New road

Due to a flood caused by an extreme weather event which washed away an existing road, a new road needs to be built between three villages in rural Tanzania so that the villagers are able to get to the nearby town to sell and buy goods. The road should pass through village B, and exactly half way between village A and C so that they can be connected to the new road by their existing road. Mark on the map where the road should be built.



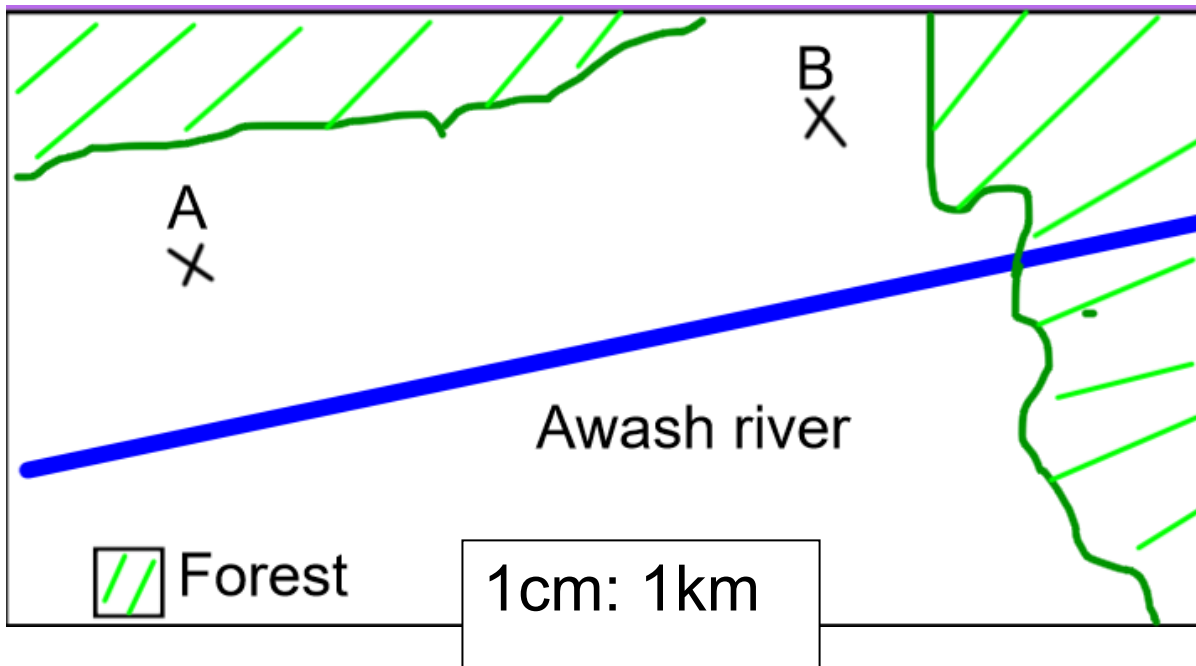
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Problem D: Internet mast

Two towns (in Oromia region, Ethiopia) have decided to build a new Internet mast. They can then use an early warning system to save lives during flooding and landslides (which are becoming more frequent and severe due to climate change).

The mast needs to be within 4km of both the towns. In order to avoid flood damage, the mast should not be built within 500m of the Awash river.

Find the area which the mast can be built in.

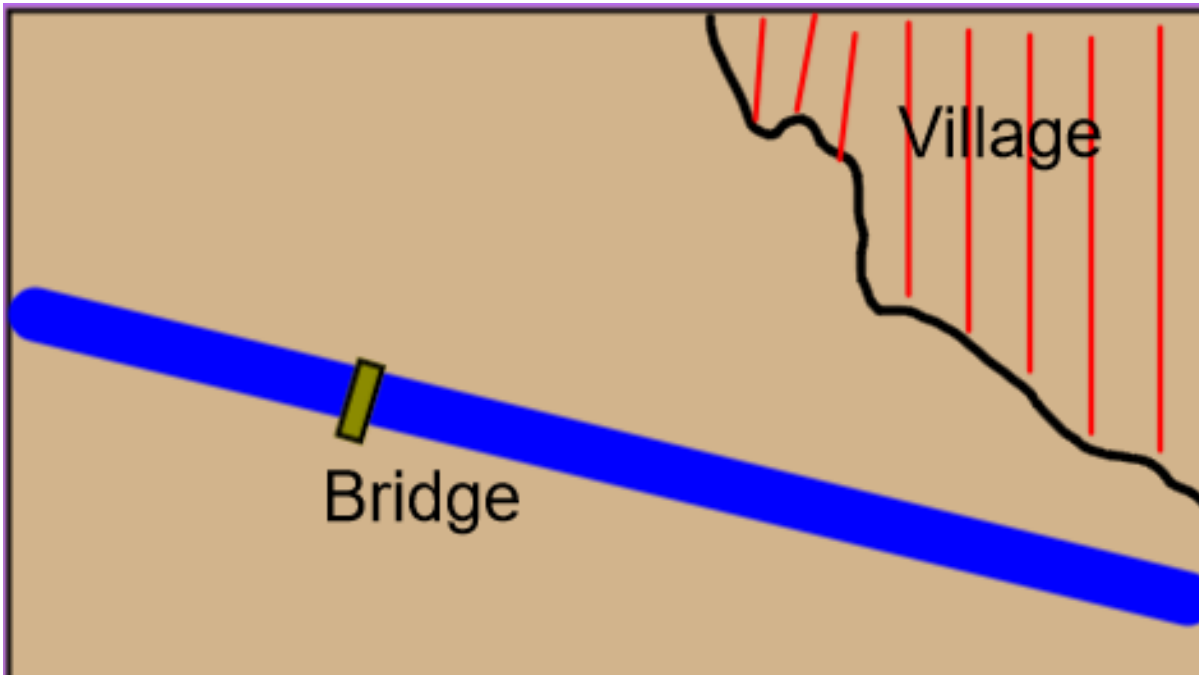


Problem E: Bridge road

A new bridge has been planned over the Imo River in Nigeria to replace the old one (which was washed away in a flood).

Mark on the map where the connecting road should go.

The road needs to pass over the bridge and form a right angle with the river.

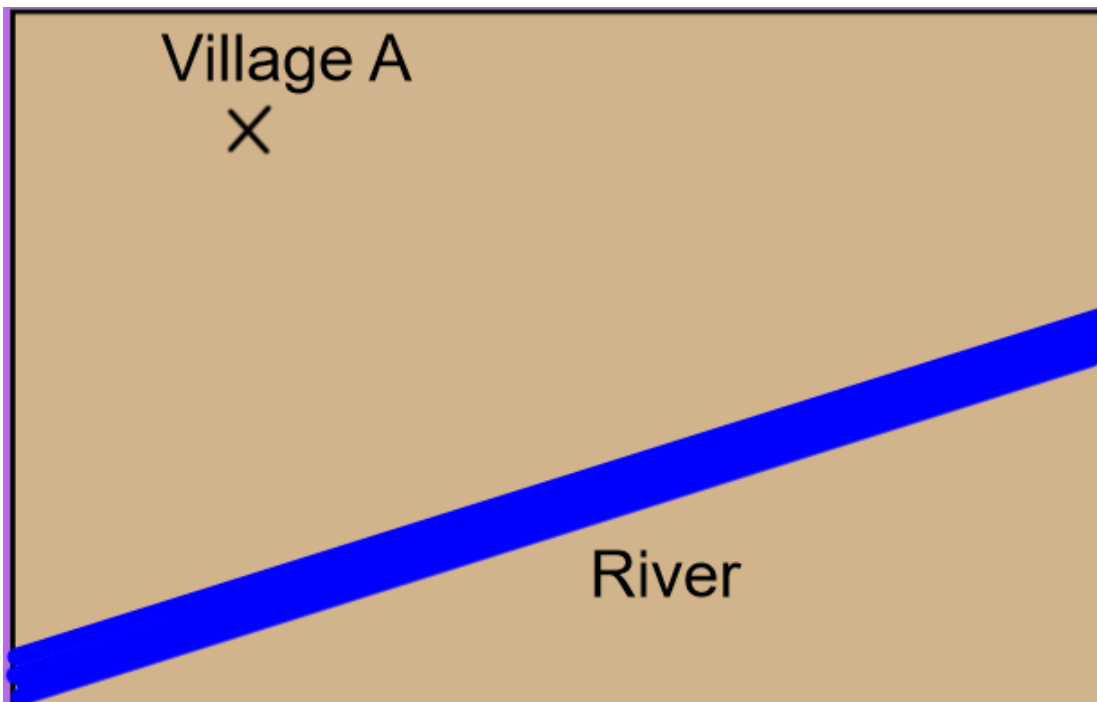


Problem F: Shortest possible path

A new path is to be built between village A and the river in Andhra Pradesh, India following a landslide caused by flooding, which destroyed the old path.

The villagers would like the path to be as short as possible, as they often carry heavy washing or buckets of water to and from the river.

Mark on the map the shortest possible path between the village and the river.

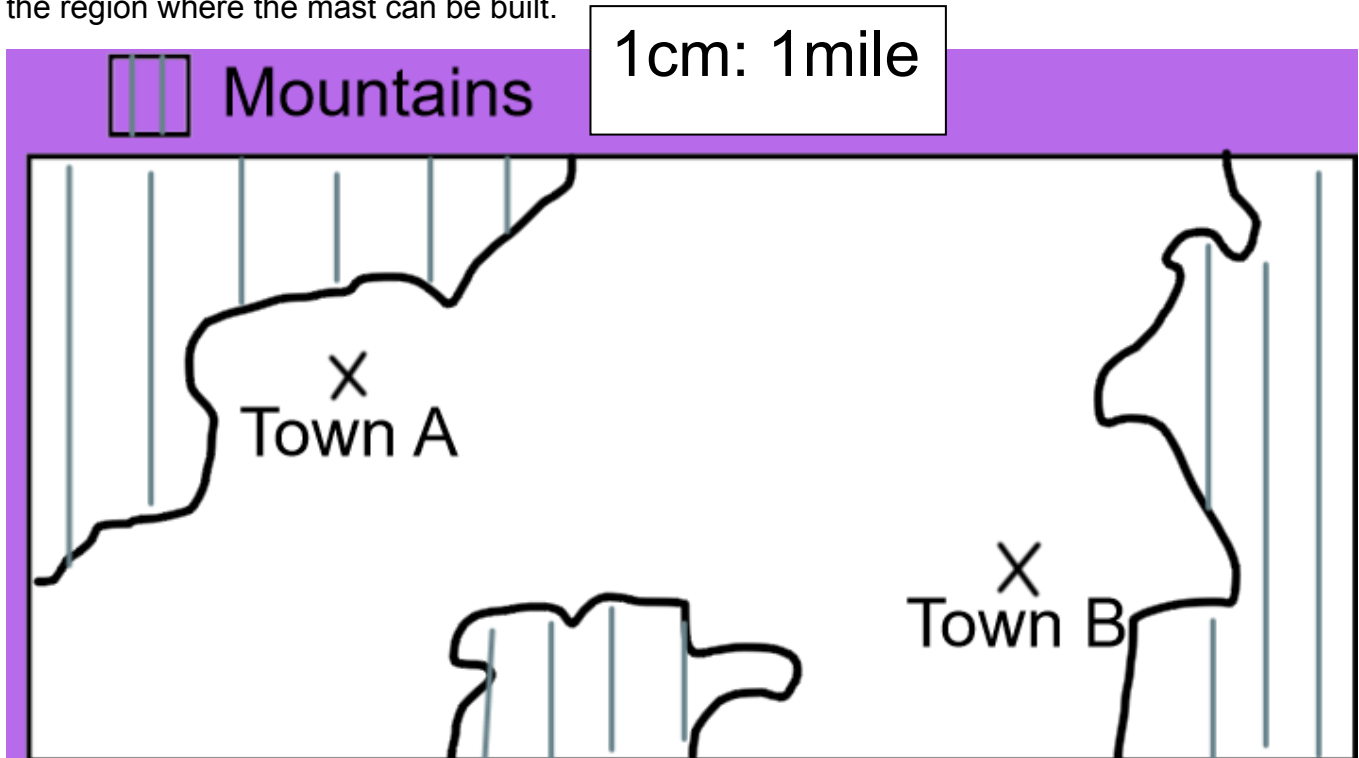


Booklet 2: Constructions

Problem G: Mobile mast

Towns A and B (in Cuba) are 8 miles apart. They want to put up a mobile phone mast. Better internet will help warn them of hurricanes and save lives. Climate change is making hurricanes more frequent and intense.

The mast needs to be less than 5 miles from Town A and nearer to Town B than Town A. Shade the region where the mast can be built.



Problem I: Solar street lamp

Below is a scale drawing of a village square in rural Bangladesh.

Lighting in the square is poor at night, due to a lack of electricity. Villagers have saved up enough money to buy 1 solar powered street lamp.

They want the lamp to be closer to the West border of the square than to the South (as the school is here), and to be within 9m of the village shop. Find the region where the lamp can be built.

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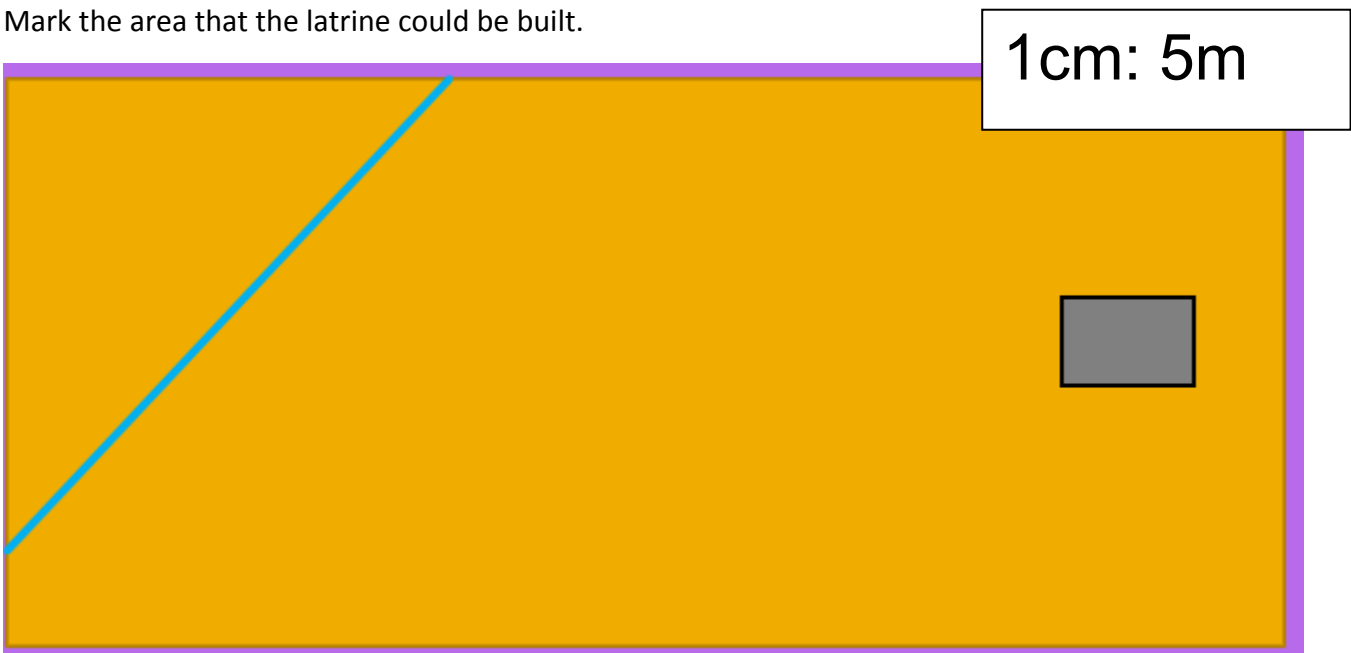


Problem J: latrine building

Maria's family needs a new toilet (latrine). Their village in Nicaragua is suffering from flooding due to climate change. Flooded latrines spread diseases and cause deaths.

So the latrine needs to be at least 20m away from the stream and 15m away from the house. She wants it as near the house as possible, so that her children don't have to go too far to go to the toilet after dark.

Mark the area that the latrine could be built.



Booklet 2: Constructions

Problem K: Coffee plantation

Karla's family has been growing coffee in the mountains of northern Nicaragua for generations. Because the climate is getting hotter, coffee can now only be grown higher up (where it is cooler).

Experts advise her to plant her new bushes within 3km of the mountain summit. Karla also wants to plant them to be close to the road, so that she doesn't have to carry the coffee too far.

Mark the area where she could put her new coffee plantation.

