

# MATHEMATICS

## Level One

### Latitude and Longitude

**Setting:** You are in Beijing City and your position is Latitude of  $39^{\circ}55'N$  and Longitude of  $116^{\circ}26' E$ . You then travel to the following cities, with Latitudes and Longitudes as given.

#### Task A

Ho Ci Min	$10^{\circ}46'N$	$106^{\circ}43'E$	
Kathmandu	$27^{\circ}42'N$	$85^{\circ}19'E$	
Apia $188^{\circ}14'E$	$13^{\circ}48'S$	$171^{\circ}46'W$	(or
Madrid	$40^{\circ}24'N$	$3^{\circ}41'E$	
Moscow	$55^{\circ}45'N$	$37^{\circ}42'E$	
Timaru NZ	$44^{\circ}23'S$	$171^{\circ}45'E$	



- (a) Express the latitudes and longitudes of these cities in decimal form.
- (b) Express the latitudes and longitudes of these cities in radian form.
- (c) Show where you have travelled on the map of the world.

#### Task B

To help determine the cost of flood insurance a surveyor is asked to find how high a house is above mean sea level. She measures from a point at mean high tide up the slope to the base of the house and gets a distance of 120m, the angle of elevation to the base of the house is  $6^{\circ}30'$ .

- 1) Draw a diagram which represents the above information
- 2) Find the elevation above mean sea level.

### Task C

To help plan for the construction of a road, a surveyor is asked to find the number of metres a road will have to ascend in order to reach the top of the hill. He measured a distance of 520m and an angle of  $4^{\circ}45'$ .

- 1) Draw a diagram which represents the above information
- 2) How much will the road rise over the 520m

