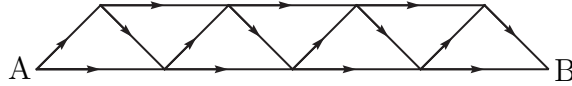


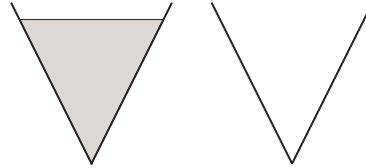
Problems, December 2005

Problem 1. Find the solutions of the equation $x^2 - 123456789x + 10 = 0$, correct to 4 significant figures.

Problem 2. The figure below represents a network of one-way streets. How many different ways are there to drive from A to B?

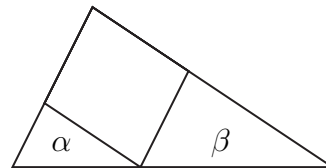


Problem 3. Alphonse and Beti have identical cone-shaped paper drinking cups. At the beginning, the tea in Alphonse's cup (left) is 8 cm deep, and Beti's cup (right) is empty. Alphonse pours half his tea into Beti's cup. How deep is the tea in Beti's cup?



Problem 4. Alicia is looking through binoculars as a distant ship sails away. Her eyes are 10 metres above sea level, and the tip of the ship's smokestack is 40 m above sea level. How far away is the tip of the smokestack at the instant that it disappears from Alicia's view? Assume that the Earth is a sphere of radius 6400 kilometres.

Problem 5. The large triangle below has been decomposed into two triangles and a parallelogram as shown. Given that the two triangles have area α and β , what is the area of the large triangle?



Problem 6. Find all integers n such that $(28.5)^n + (99.5)^n$ is an integer.