

2011 UQ/QAMT Problem Solving Competition - Year 8 Paper

All questions have equal value.

Question 1

Find a such that

$$1 + \frac{1}{2 + \frac{1}{3 + \frac{1}{a}}} = \frac{2873}{2011}.$$

Question 2

Find a two digit number, x , such that the sum of the digits in x^5 is x .

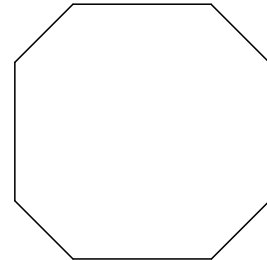
Question 3

There are four houses on a street. Each house is a different colour, blue, red, white or black. Each house is inhabited by a different animal and has a different type of tree growing outside it. The tortoise lives in house three while the dog lives directly next to the black house. The pine tree grows in front of house four, the gum tree grows in front of house two and the maple tree grows directly next to the dog's house. The second house is red and the first house is not blue. If the horse lives in house two, what colour is the butterfly's house?

Question 4

An equiangular octagon has four sides of length 1 and four sides of length $\sqrt{2}/2$, arranged so that no two consecutive sides have the same length.

What is the area of the octagon?



Question 5

Sophia and Ann competed in a 12 000 metre cross-country run which was run on an out-and-back course (where the runners turned at the halfway mark and ran back to finish where they started). Sophia finished in 60 minutes while Ann finished in 65 minutes. Assuming that each girl ran at a steady speed, how far had Ann run when she met Sophie running in the other direction?