THE UNIVERSITY
OF QUEENSLAND
AUSTRALIA

2016 UQ/QAMT Problem Solving Competition - Year 7 & 8 Paper

Two hours allowed. All questions have equal value. Non-CAS calculators may be used.

Question 1
In 2016 the first day of lectures at the University of Queensland was Monday, February 29th. When is the next year in which there will be a February 29th falling on a Monday?
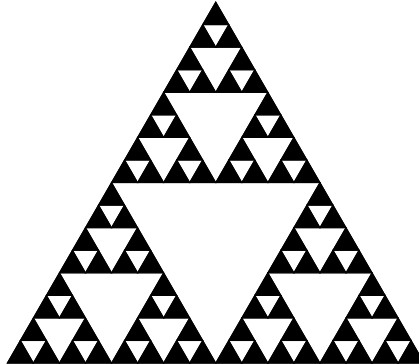
Question 2
Suppose a parallelogram has corners $ABCD$, labelled clockwise (so AB is parallel to DC). Let P be a point inside the parallelogram with angles $\angle BAP = 42°$ and $\angle CDP = 20°$. What is the angle $\angle APD$?

Question 3
How can the numbers 1^2, 2^2, ..., 15^2 be arranged into 4 groups, such that each group has the same sum? Every number must be used exactly once but the groups can be of different sizes.

Question 4
How many triangles appear in the following diagram?

Question 5
Each letter Q, A, ... below corresponds to a different digit $0, 1, \ldots, 9$ and the calculation is a valid addition. No initial digit (Q, T or R) can be 0. What is the value of M?

		Q	A	M	T
+		T	E	S	T
+	Q	U	E	S	T
=	R	E	S	U	L	T

WOLFRAM