

The University of Western Australia  
SCHOOL OF MATHEMATICS & STATISTICS

AMO/TT TRAINING SESSIONS

**Selected 1997–1998 Tournament of the Towns Problems**

1. Prove that the equation  $x^2 + y^2 - z^2 = 1997$  has infinitely many solutions in integers  $x$ ,  $y$  and  $z$ .  
(Junior O Level Autumn, N Vassiliev, 3 points)

2. Prove that the equation

$$xy(x - y) + yz(y - z) + zx(z - x) = 6$$

has infinitely many solutions in integers  $x$ ,  $y$  and  $z$ .

(Senior O Level Autumn, N Vassiliev, 4 points)

3. For every three-digit number, we take the product of its three digits and then we add all these products together. What is the result?

(Junior O Level Spring, G Galperin, 4 points)