MATHEMATI   S.
Proble

1. Let x and y be positive i   ations to $3x + 5y = 100$

2. John has $7. Each day   ice for 2, or pin
   for 2. In how many

3. Let x_1t3z1Td154   9701   114.7321.7

Senior Questions

1. Let x, y, k be integers. Fermat's theorem on sums of two squares states that: A prime number p is of the form $p = 4k + 1$ if and only if $p = x^2 + y^2$.

   Use the above theorem or otherwise, show that for each prime p of the form $p = 4k + 1$, there is only one right-angled triangle with integer side lenghts a, b and p, such that $a^2 + b^2 = p^2$.

2. In every cell of a square table is a number. The sum of the largest two numbers in each row is a and the sum of the largest two numbers in each column is b. Prove that $a = b$.

3. A positive integer n is divided by d and the quotient and remainders are q and r