Prelim Revision   Number Theory

1) Prove by contradiction that $\sqrt{3}$ is irrational.

2) Prove by contradiction that if n^2 is odd the n is odd.

3) Prove that $\displaystyle\sum_{r=1}^{n} \frac{1}{r(r+1)} = \frac{n}{n+1}$ by induction

4) $\displaystyle\sum_{r=3}^{n}(2r-1) = (n-2)(n+2)$ $n \geq 3$ by induction

5) Prove by induction that the sum of the first n odd numbers is a perfect square.

(ie. $\displaystyle\sum_{k=1}^{n} 2k - 1 = p^2$)