Mathematical Proof (Higher)

Odd and even numbers

a) Prove that the sum of two even numbers is even.

b) Prove that the product of two distinct odd numbers is also odd.

c) Prove that the square of an odd number is also odd.

d) Prove that the product of an even number and an odd number is even.

e) Prove that the sum of two odd numbers is even.

f) Prove that the sum of an even number and an odd number is odd.

Consecutive numbers

a) Given that n, $n + 1$ and $n + 2$ are consecutive numbers. How would you write three consecutive even numbers?

b) Prove that the sum of three consecutive odd numbers is odd.

c) Prove that the sum of four consecutive even numbers is divisible by four.

Direct proof of a statement

Prove that $(n + 3)^2 - (n + 1)^2$ is a multiple of four.

Using algebra skills

Prove that $2x^2 - 6x + 5$ is always positive.

Giving a counterexample

Haz thinks that every term generated by $u_n = 4n - 1$ is a prime number. Find a counterexample to show that Haz is incorrect.