Prove the following:

If an integer is divisible by 6 then it is also divisible by 3.

If an integer is divisible by 6 then twice that integer is divisible by 4.

The square of an even number is divisible by 4.

The sum of three consecutive integers is divisible by 3.

If two integers are each divisible by some integer n, then their sum is divisible by n.

xy is odd if and only if x and y are odd integers.

The sum of an even integer and an odd integer is odd.

The square of an odd integer equals 8k+1 for some integer k.

The product of two consecutive integers is even.

The sum of an integer and its square is even.

If an integer x is positive then x+1 is positive.

For all integers $n > 0$, the summation of 2^i from i=1 to n is $2^{n+1} - 2$.

For all integers $n > 0$, the summation of i from i=1 to n is (n(n+1)) / 2.

For all integers $n > 0$, the summation of i^2 from i=1 to n is (n(n+1)(2n+1)) / 6.

For all integers $n > 0$, the summation of $2i$ from i=1 to n is $n^2 + n$.

For all integers $n > 1$, the summation of i(i+1) from i=1 to n-1 is (n(n-1)(n+1)) / 3.

For all integers $n \geq 0$ and all reals r not equal to 1, the summation of r^i from i=0 to n is

$(r^{n+1} - 1)$ / (r-1).

For all integers $n > 0$, the summation of i(i!) from i=1 to n is (n+1)! -1.

For all integers $n \geq 0$, $n^3 + 2n$ is divisible by 3.

For all integers $n \geq 1$, n < 2^n.

For all integers $n \geq 2$, n! < n^n.

Using contradiction, if x is an integer and 3x+2 is even, then x is even.

Using contradiction, the square root of 2 is irrational.