5. If n is an integer that is greater than 1, then

n is prime $\Leftrightarrow$ $\forall$positive integers r and s,

if $n = r \cdot s$ then $r = 1$ or $s = 1$.

n is composite(not prime) $\Leftrightarrow$ $\forall$positive integers r and s such that $n = r \cdot s$

and $r \neq 1$ and $s \neq 1$.

Prove: $n^2 + 3n + 2$ is not prime.

Proof by contradiction:

Let $n^2 + 3n + 2 = r.s$

Assume $r = 1$ and $s = 1$

$n^2 + 3n + 2 = r.s = 1$

$n^2 + 3n = -1$

but $n^2 + 3n$ cannot be -1 because n is an integer greater than 1.

This introduces a contradiction

So this proves that $r \neq 1$ and $s \neq 1$.

Thus $n^2 + 3n + 2$ holds for the composite case and is not prime.