EKKER

Inequalities.

Prove $n! > 2^n$, $n \geq 4$ $n \in N$.

Prove $n = 4$

$4! > 2^4$

$24 > 16$ True

Assume $n = k$

$k! > 2^k$

Prove $n = k+1$ $(k+1)! > 2^{k+1}$

$(k+1)k! > 2(2^k)$

Multiplication both sides and assumption.

$k+1 > 2$ $k \geq 4$ $k! > 2^k$ from assumption.

Factorial bigger one down ⇒ combinations notes.

Conclusion - Since true for $n = 4$ and $n = k+1$ true for all $n \geq 4$

Prove $3^n > 2n+1$ $n > 1$, $n \in N$

Prove $n = 2$ $\Rightarrow 3^2 > 2(2)+1$

$9 > 5$ True

Assume $n = k$ $3^k > 2k+1$

Prove $n = k+1$

$3^{k+1} > 2(k+1)+1$

$3 . 3^k > 2k+2+1$

Need the assumption

LHS has multiply but right has adding

Create addition on left.

$$(2+1)3^k > 2k+1+2$$

$$2(3^k) + 3^k > 2k+1+2$$

$3^k > 2k+1$ assumption

$2(3^k) > 2$ since $k > 1$

Conclusion $\Rightarrow$.