LEMMA: spanning of VAL*, DIV/0*, ATM*

$VAL^* \cup DIV/0^* \cup ATM^* = EXP$

PROOF

let normal forms (NF) = {VAL, DIV/0, ATM}

let $e \in EXP$

we wish to show that

$e \in \alpha^*$ for some $\alpha \in NF$

the e simplifies to a unique normal form,

say e_n

Since the normal forms of $\rightarrow$ are spanned by VAL, DIV/0, ATM

e_n α for some $\alpha \in NF$

by def.

e α^*

THEORM : partioning of EXP by, VAL*,
DIV/0*,
ATM*

the sets VAL*,
DIV/0*,
ATM* partion EXP

PROOF

follows from the previous two lemmas
(spanning & disjointedness of VAL*,
DIV/0*,
ATM*)