Proof of Theorem 291

The theorem to be proved is

$a \oplus c$ begins with a

Suppose the theorem does not hold. Then, with the variables held fixed,

(H) $[[\neg\ (a \oplus c)$ begins with $(a)]]$

Special cases of the hypothesis and previous results:

0: $\neg\ a \oplus c$ begins with a from H:a:c

1: $c \preceq a \oplus c$ from 277;a;c

2: $a \oplus c$ begins with a $\vee$ $\neg\ c \preceq a \oplus c$ $\vee$ $\neg\ a \oplus c = a \oplus c$ from $290^{\leftarrow}$;$a \oplus c$;a;c

3: $a \oplus c = a \oplus c$ from 5;$a \oplus c$

Inferences:

4: $\neg\ c \preceq a \oplus c$ $\vee$ $\neg\ a \oplus c = a \oplus c$ by
- 0: $\neg\ a \oplus c$ begins with a
- 2: $a \oplus c$ begins with a $\vee$ $\neg\ c \preceq a \oplus c$ $\vee$ $\neg\ a \oplus c = a \oplus c$

5: $\neg\ a \oplus c = a \oplus c$ by
- 1: $c \preceq a \oplus c$
- 4: $\neg\ c \preceq a \oplus c$ $\vee$ $\neg\ a \oplus c = a \oplus c$

6: QEA by
- 3: $a \oplus c = a \oplus c$
- 5: $\neg\ a \oplus c = a \oplus c$