Proof of Theorem 178

The theorem to be proved is

$\mathrm{Q}x \neq 0$

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

(H) $[[(\mathrm{Q}x) = (0)]]$

Special cases of the hypothesis and previous results:

0: $\mathrm{Q}x = 0$ from H:x

1: $\mathrm{Q}x$ is a power of two from 158;x

2: $\neg$ 0 is a power of two from 134

Equality substitutions:

3: $\neg\ \mathrm{Q}x = 0 \quad \vee \quad \neg\ \mathrm{Q}x$ is a power of two $\quad \vee \quad$ 0 is a power of two

Inferences:

4: $\neg\ \mathrm{Q}x$ is a power of two $\quad \vee \quad$ 0 is a power of two by

0: $\mathrm{Q}x = 0$

3: $\neg\ \mathrm{Q}x = 0 \quad \vee \quad \neg\ \mathrm{Q}x$ is a power of two $\quad \vee \quad$ 0 is a power of two

5: 0 is a power of two by

1: $\mathrm{Q}x$ is a power of two

4: $\neg\ \mathrm{Q}x$ is a power of two $\quad \vee \quad$ 0 is a power of two

6: QEA by

2: $\neg$ 0 is a power of two

5: 0 is a power of two