Theorem Proving and Equality

Exercise 31 *Prove that the inference rules of $\mathcal{H}$ are refutation sound.*

Exercise 32 *Saturate the following set of clauses with inferences from $\mathcal{G}$:*
$\{a \approx b \rightarrow,$
$\rightarrow f(a) \approx b,$
$\rightarrow f(a) \approx a\}$

Use the lpo on the terms induced by the precedence: $f > b > a$.

Exercise 33 *Show that saturation even in the ground case may be non-terminating, on the following example. Let the precedence on symbols be: $a > f > b$.*

Saturate with $\mathcal{G}$ the following set:
$\{\rightarrow f(a) \approx a,$
$\rightarrow f(b) \approx a\}$

Exercise 34 *Assume the following precedence on the symbols in a signature: $s > + > 0$.*

Assuming lpo induced by this precedence, saturate the following set of clauses with the inferences from $\mathcal{H}$:
$\{\rightarrow x + 0 \approx x,$
$\rightarrow s(x + y) \approx x + s(y)\}$

Does it terminate? What if you assume a different precedence, e.g. $+ > s > 0$?