Theorem Proving and Equality

Exercise 8 *Formalize and prove using resolution and paramodulation:*

Mary's boyfriend is a student and he owns a car.
John is the only student who owns a car.
Therefore John is Mary's boyfriend.

Use the following functions and predicates:
$f(x)$ - *boyfriend of* x
$C(x)$ - x *owns a car*
$S(x)$ - x *is a student.*
Hint: you need also some constants!

Exercise 9 *Formalize and prove using resolution and paramodulation:*

Prof. Smith has only very good students at his lectures.
John and Mary attend the same lectures.
Mary attends Prof. Smith's lecture.
Therefore John is a very good student.

Exercise 10 *Formalize and prove using resolution and paramodulation:*

Every part is made either by manufacturer A or by manufacturer B.
All fragile parts are stored in the warehouse of their manufacturer.
Manufacturer B cannot manufacture titanium parts.
The part I need is fragile and made of titanium.
Therefore, the part I need is in the A's warehause.

Use the following functions and predicates:

$m(x)$ - *manufacturer of part* x,
$W(x, y)$ - *part* x *is stored in* y*'s warehause,*
$T(x)$ - *part* x *is made of titanium,*
$F(x)$ - *part* x *is fragile,*
a - *constant for "the part I need"*