Name: _____ Signature: _____ Student Number: _____

1. Which of the following are valid deductions?

   (a) Mammals are warm-blooded animals. Whales are mammals.
       Therefore whales are warm-blooded animals.

   (b) Mammals are warm-blooded animals. Fish are not mammals.
       Therefore fish are not warm-blooded animals.

   (c) Some doctors are surgeons. Some women are doctors. Therefore some women are surgeons.

   (d) All horses are animals. Therefore all horses' heads are animal heads.

   ANSWER:

2. The "exclusive or" operation $p \oplus q$ says that one of p and q is true and the other is false.

   (a) Write down the truth table of the "exclusive or" operator.

ANSWER:	p	q	$p \oplus q$
	F	F	
	F	T	
	T	F	
	T	T	

   (b) Express the "exclusive or" operator using $\neg, \wedge, \vee$.

   ANSWER:

   (c) Write down the truth table for the formula you gave in (b) to confirm that it coincides with (a).

ANSWER:	p	q	
	F	F	
	F	T	
	T	F	
	T	T	