Homework #8

#1 (8 Points) <u>True or False</u>

a) Regular languages are recursive	TRUE	FALSE
b) Context free languages are recursively enumerable (r.e.)	TRUE	FALSE
c) Recursive languages are r.e	TRUE	FALSE
d) R.e. languages are recursive	TRUE	FALSE

#2. (20 Points) a) Show computations with 000111 and 101 on the following Turing Machine

State	**0**	**1**	**X**	**Y**	$\sqcup$
q_0	(q_1,X,R)	-	-	(q_3,Y,R)	-
q_1	$(q_1,0,R)$	(q_2,Y,L)	-	(q_1,Y,R)	-
q_2	$(q_2,0,L)$	-	(q_0,X,R)	(q_2,Y,L)	-
q_3	-	-	-	(q_3,Y,R)	$(q_4,\sqcup,R)$
q_4	-	-	-	-	-

b) What is L(M) (you'll have to guess)

#3. (12 Points) Construct a Turing Machine to compute $\{w\, w^R \mid w\ \varepsilon\ \{0,1\}^*$

a) Show pseudo-code that describes how the TM operates
b) Create the actual transitions
c) Show your TM processing (i) 1001, (ii) 101 and (iii) 110

#4. (5 Points) Show that r.e. languages are closed under union and intersection.

#5. (5 Points) Post to the bb applications of:

a) Turing Machines
b) Recursive Languages
c) Recursively Enumerable Languages

Please don't repeat others postings (so the earlier you do this, the easier it will be)