HW 13 CMSC 452. Morally DUE Dec 11

NOTE- FOR PRACTICE FOR THE FINAL DO THE PROJECT ON THE WEB.

NOTE- Morally due the last day of class, a thursday- thats because I will be going over these problems that day as a review. AND some of them are based on stuff I will do on Dec 4.

1. (0 points) When is the final? (Hint- Look at the Course Webpage under Policy.)

2. (25 points) Let A be an index set such that the the index of the function that diverges everywere is IN A. Prove that A is undecidable. (This is the case of Rice's Theorem that I didn't do in class.)

3. (25 points) Show that if $L \in \Sigma_1$ then $L^* \in \Sigma_1$. Use the quantifier definmition of Σ_1.

4. (25 points) Show that if $L \in NP$ then $L^* \in NP$. Use the quantifier definmition of NP.

5. (25 points) Let $M_1, M_2, \ldots$ be a standard list of Turing machines. A set is *co-finite* if its COMPLEMENT is finite. Show that the following set is in Σ_3.

$$\{e \mid \text{ the set of } x \text{ such that } M_e(x)\downarrow \text{ is co-finite } \}.$$

6. (0 points but you HAVE to do it or you lose 50 points on this HW) HAND IN SEPARATELY
   (a) What was your favorite part of the course?
   (b) What was your least favorite part of the course? Why? Should I include it next time I teach the course? Why or why not?