CMSC 652 HW 10. Morally Due May 6

Let $PROMISESAT(f(n), g(n)$ be the following problem: given a boolean formula that you are PROMISED has either exactly $f(n)$ satisfying assignments OR exactly $g(n)$ satisfying assignments, determine which is the case.

1. (30 points) Show that $PROMISESAT(n^2, n^3)$ is in AM.
2. (30 points) Find some general condition on f, g such that $PROMISESAT(f(n), g(n))$ is in AM. It NEED NOT cover all cases, but should cover more than (n^2, n^3).
3. (40 points) Show that if $NP \subseteq coNP/\text{poly}$ then $\Sigma_2^p \subseteq NP/\text{poly}$.