(1) Give an example of logical formulas $p(x)$ and $q(x)$ and a set S such that the following are **not** logically equivalent. Justify your answer with a proof.

- $\exists x \in S, (p(x) \wedge q(x))$
- $(\exists x \in S, p(x)) \wedge (\exists x \in S, q(x))$

TURN OVER

(2) Prove that if m and n are odd integers, then $m^2 - n^2$ is divisible by 8. You may use basic facts about odd and even numbers, i.e. that the sum of even numbers is even, and the sum of an odd number and an even number is odd, etc.