Show $T(n) = 4n^2 + 2n + 1 \in \Theta(n^2)$

First show that $T(n) \in O(n^2)$

$$4n^2 + 2n + 1 \leq cn^2$$
$$n = 1$$
$$4 + 2 + 1 \leq 7$$
$$c = 7, n_0 = 2$$
$$4n^2 + 2n + 1 \leq 7n^2 \forall n \leq 1$$
$$\therefore T(n) \in O(n^2)$$

and then $T(n) \in \Omega(n^2)$

$$4n^2 + 2n + 1 \geq cn^2$$
$$n = 1, c = 1$$
$$4n^2 + 2n + 1 \geq n^2 \forall n \geq 1$$

$T(n) \in O(n^2)$ and $T(n) \in \Omega(n^2) \therefore T(n) \in \Theta(n^2)$