8. Claim : $3n^2+5n+1$ is $\Theta(n^2)$

$3n^2+5n+1$ is $O(n^2)$:

$$3n^2+5n+1 \leq 3n^2+3n^2+3n^2$$
$$\leq 9n^2$$

$c = 9, \quad n_0 = 1$

$3n^2+5n+1$ is $\Omega(n^2)$:

$$3n^2+5n+1 \geq n^2$$

$c = 1 \quad n_0 = 1$

Since $3n^2+5n+1$ is $O(n^2)$ and $\Omega(n^2)$, it is $\Theta(n^2)$