

What is the time complexity of, $f(n) = 5n^2 + 3n + 4$

What is the time complexity of given function,

$$f(n) = 5n^2 + 3n + 4 ?$$

Solution:

Given,

$$f(n) = 5n^2 + 3n + 4$$

- $5n^2 + 3n + 4 \geq 5n^2 + 3n + 4$ for all $n \geq 1$
- $5n^2 + 3n + 4 \geq 5n^2 + 3n$ for all $n \geq 1$
- $5n^2 + 2n + 4 \geq 5n^2$ for all $n \geq 1$
- $f(n) \geq 5n^2$ for all $n \geq 1$

Compare with the standard Big omega notation equation that is,

$$f(n) \geq c \cdot g(n) \text{ for all } n \geq n_0$$

So here $c = 5$, $g(n) = n^2$ and $n_0 = 1$

- $f(n) = \Omega(g(n))$
- $f(n) = \Omega(n^2)$