

Problems.

1. **(Taylor's Theorem with the Integral Form Remainder)** If a function f is differentiable through order $n + 1$ in an interval I containing c , then, for each x in I ,

$$f(x) = f(c) + f'(c)(x - c) + \frac{f''(c)}{2!}(x - c)^2 + \cdots + \frac{f^{(n)}(c)}{n!}(x - c)^n + R_n(x)$$

where

$$R_n(x) = \frac{1}{n!} \int_c^x (x - t)^n f^{(n+1)}(t) dt$$

Prove the theorem.