

Section 10.9 Applications of Taylor polynomials

Suppose that

$$f(x) = \sum_{n=0}^{\infty} \frac{f^{(n)}(a)}{n!} (x - a)^n$$

Consider

$$T_n(x) = \sum_{k=0}^n \frac{f^{(k)}(a)}{k!} (x - a)^k$$

is the n th-degree Taylor polynomial of f at a .

Example 1. Approximate $f(x) = \sqrt{x}$ by a Taylor polynomial of degree 3 at $a = 1$.

Example 2. Approximate $f(x) = \sin x$ by a Taylor polynomial of degree 4 at $a = \frac{\pi}{6}$.