1   Taylor Series

1.1   Concepts

1. The Taylor series for a function $f(x)$ around a point $x = c$ is given by

$$f(x) \approx f(c) + \frac{f'(c)}{1!}(x - c) + \frac{f''(c)}{2!}(x - c)^2 + \frac{f'''(c)}{3!}(x - c)^3 + \frac{f^{(4)}(c)}{4!}(x - c)^4 + \cdots$$

1.2   Problems

2. Use the second order Taylor series to approximate $\sqrt{17}$.

3. Find the Taylor series for $x^5 + 3x^3 + 2x + 10$.

4. Use the second order approximation to $\sqrt[3]{28}$.

5. Use the second order approximation to find $\ln 1.1$.

6. Use the second order approximation to find $\sqrt{5}$.

7. Use the second order approximation to find $e^{0.1}$.

8. Use the second order approximation to find $\sec(0.1)$.

9. Use the third order approximation to find $\sin(0.1)$.

10. Use the second order approximation to find $\cos(0.1)$.