

1. Use Linearization to approximate the following values. Additionally, find the error and the relative error.

(a)  $\sqrt[3]{1.1}$

(b)  $\tan^{-1}(\sqrt{3} + 0.15)$  (Convert your answer to degrees)

2. Using Newton's Method find the root to the following functions, to the nearest hundredth. (You must show each iteration to get full credit)

(a)  $f(x) = x^5 + x + 1$

(b)  $g(x) = \cos^{-1} x - e^x$

3. Using the Taylor series expansion about  $x_0 = 0$  show that

$$e^{i\theta} = \cos \theta + i \sin \theta$$

where  $i^2 = -1$ .

4. Find the fourth-order Taylor series expansion of the following function about the given  $x_0$ .

(a)  $f(x) = 2x^4 + 3x^2 - x + 4$ ,  $x_0 = 0$  (Simplify)

(b)  $g(x) = \ln x$ ,  $x_0 = 1$

5. Find the absolute maximum and absolute minimum values of  $f$  on the given interval.

(a)  $f(x) = x^3 - 12x + 1$ ,  $[-3, 5]$

(b)  $f(x) = x - 2 \cos x$ ,  $[-\pi, \pi]$