

Worksheet #26: Newton's Method

Basic Guidelines: Newton's Method gives a procedure for finding the location of a root of an equation, where $f(x) = 0$ by successive iterations of the following formula:

Begin with an initial estimate: x_1

Obtain the next estimates x_2, x_3, x_4 , etc. by plugging the previous estimate into the recursive formula:

$$x_{n+1} = x_n - \frac{f(x_n)}{f'(x_n)}$$

Continue the process until the next iteration agrees with the previous one in the required number of decimal places.

1. Approximate $\sqrt{3}$ by Newton's Method as follows:

Observe that $\sqrt{3}$ is a solution to the equation $f(x) = x^2 - 3$

(a) Write the expression for Newton's Method using this function: $f(x) = x^2 - 3$:

(b) Utilize the initial approximation $x_1 = 1$ to compute the next two iterations:

(c) Using a calculator, compute the next several iterations:

$$x_4 =$$

$$x_5 =$$

$$x_6 =$$

$$x_7 =$$