Supplemental Exercises for Section 4.7

Newton's Method can be used to approximate square roots and other roots as was Linear Approximation. In the following exercises you will see that Newton's method produces much better approximations of roots. In later chapters of the text it will be seen that Linear Approximation can also be improved.

In each of the following exercises use Newton's Method to approximate the given root by computing x_2. Compare x_1 with the approximation of the same root using Linear Approximation. Begin by finding a polynomial equation to which the desired root is a solution.

1. Approximate $\sqrt{15}$. Start with $x_0 = 4$.

2. Approximate $\sqrt{26}$. Start with $x_0 = 5$.

3. Approximate $\sqrt[3]{9}$. (Make an intelligent choice for x_0.)

4. Approximate $\sqrt[3]{4}$. (Make an intelligent choice for x_0.)

Selected Answers

1. $\dfrac{1921}{496}$

3. $\dfrac{23401}{11250}$