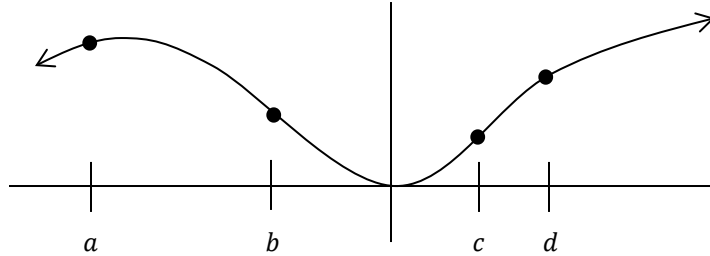


Homework Set 26

Sect 4.6: Newton's Method

1. For which of the initial approximations: $x_1 = a$, $x_1 = b$, $x_1 = c$, and $x_1 = d$ will Newton's method work so that the subsequent x_n approximations will approach the root of the equation $f(x) = 0$?



2. Use Newton's method to approximate $\sqrt[5]{20}$ correct to 8 decimal places.
3. Use Newton's method to approximate the root of $x^4 - 2x^3 + 5x^2 - 6 = 0$ in the interval $[1,2]$ correct to 6 decimal places.

4. Use Newton's method to approximate the positive root of $3 \sin x = x$ correct to 6 decimal places.

5. For the following questions, use the equation $x^3 - 15x + 5 = 0$ on the interval $[-2,2]$.

a. Use the Intermediate Value Theorem to show that there is at least one root in the interval.

b. Use the Mean Value Theorem to show that there is exactly one root.

c. Use Newton's method to find this root correct to 6 decimal places.