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**Homework number:** 5  
**Homework title:** Exercise 5.1

### Problem Description

Consider the nonlinear equation

$$f(x) = x^2 - 2 = 0$$

- (a) With  $x_0 = 1$  as a starting point, what is the value of  $x_1$  if you use Newton's method for solving this problem?
- (b) With  $x_0 = 1$  and  $x_1 = 2$  as starting points, what is the value of  $x_2$  if you use the secant method for the same problem?

### Problem Solution

ad (a)  $x_1 = x_0 - f(x_0)/f'(x_0) = 1 - (-1)/2 = 1.5$

ad (b)  $x_2 = x_1 - \frac{f(x_1)(x_1 - x_0)}{f(x_1) - f(x_0)} = 2 - 2/3 = 1.33$