Multiple-Choice Test

Secant Method
Chapter 03.05

1. The secant method of finding roots of nonlinear equations falls under the category of __________ methods.
   (A) bracketing
   (B) graphical
   (C) open
   (D) random

2. The secant method formula for finding the square root of a real number \( R \) from the equation \( x^2 - R = 0 \) is
   (A) \( \frac{x_i x_{i-1} + R}{x_i + x_{i-1}} \)
   (B) \( \frac{x_i x_{i-1}}{x_i + x_{i-1}} \)
   (C) \( \frac{1}{2} \left( x_i + \frac{R}{x_i} \right) \)
   (D) \( \frac{2x_i^2 + x_i x_{i-1} - R}{x_i + x_{i-1}} \)

3. The next iterative value of the root of \( x^2 - 4 = 0 \) using secant method, if the initial guesses are 3 and 4, is
   (A) 2.2857
   (B) 2.5000
   (C) 5.5000
   (D) 5.7143

4. The root of the equation \( f(x) = 0 \) is found by using the secant method. Given one of the initial estimates is \( x_0 = 3 \), \( f(3) = 5 \), and the angle the secant line makes with the \( x \)-axis is 57°, the next estimate of the root, \( x_1 \), is
   (A) −3.2470
   (B) −0.24704
   (C) 3.247
   (D) 6.2470
5. For finding the root of \( \sin x = 0 \) by the secant method, the following choice of initial guesses would not be appropriate.

(A) \( \frac{\pi}{4} \) and \( \frac{\pi}{2} \)

(B) \( \frac{\pi}{4} \) and \( \frac{3\pi}{4} \)

(C) \( -\frac{\pi}{2} \) and \( \frac{\pi}{2} \)

(D) \( \frac{\pi}{3} \) and \( \frac{\pi}{2} \)

6. When drugs are given orally to a patient, the drug concentration \( c \) in the bloodstream at time \( t \) is given by a formula

\[
c = Kte^{-at}
\]

where \( K \) is dependent on parameters such as the dose administered while \( a \) is dependent on the absorption and elimination rates of the drug. If \( K = 2 \) and \( a = 0.25 \), and \( t \) is in seconds and \( c \) is in \( \text{mg/ml} \), the time at which the maximum concentration is reached is given by the solution of the equation

(A) \( 2te^{-0.25t} = 0 \)

(B) \( 2e^{-0.25t} - 2te^{-0.25t} = 0 \)

(C) \( 2e^{-0.25t} - 0.5te^{-0.25t} = 0 \)

(D) \( 2te^{-0.25t} = 2 \)

For a complete solution, refer to the links at the end of the book.