Secant Method

$$x^3 = 20$$

$x_0 = 4 \quad x_1 = 5.5$ (Initial guess)

Find the estimate after 2nd iterations

Soln $x^3 = 20 \Rightarrow x^3 - 20 = 0 = f(x)$

$$x_{i+1} = x_i - \frac{f(x_i)(x_i - x_{i-1})}{f(x_i) - f(x_{i-1})}$$

$i = 1$

$$x_2 = x_1 - \frac{f(x_1)(x_1 - x_0)}{f(x_1) - f(x_0)}$$

$$= 5.5 - \frac{(5.5^3 - 20)(5.5 - 4.0)}{(5.5^3 - 20) - (4^3 - 20)}$$

$$= 3.353$$

$$\epsilon_a = \left| \frac{x_2 - x_1}{x_2} \right| \times 100$$

$$= \left| \frac{3.353 - 5.5}{3.353} \right| \times 100$$

$$= 63.92\%$$

$$x_3 = x_2 - \frac{f(x_2)(x_2 - x_1)}{f(x_2) - f(x_1)}$$

$x_1 = 5.5 \quad x_2 = 3.353$

$x_2 = 3.059$

$$E_a = \left| \frac{x_3 - x_2}{x_3} \right| \times 100$$

$$= \left| \frac{3.059 - 3.353}{3.059} \right| \times 100$$

$$= 9.691\%$$