

CHUCKEVOO1

1 (a)

$$x_{n+1} = x_n - (\cos x_n \sin x_n + R \cos^2 x_n)$$

$$x_{n+1} = x_n - \cos x_n [\sin x_n + R \cos x_n]$$

Newton's formula:

$$x_{n+1} = x_n - \frac{f(x_n)}{f'(x_n)}$$

$$x_n - \frac{f(x_n)}{f'(x_n)} = x_n - \cos x_n [\sin x_n + R \cos x_n]$$

$$\frac{-f(x_n)}{f'(x_n)} = 0 - \cos x_n [\sin x_n + R \cos x_n]$$

$$\frac{f(x_n)}{f'(x_n)} = \cos x_n [\sin x_n + R \cos x_n]$$

$$= \frac{1}{2} \sin(2x) = \frac{1}{2} R (-1 - \cos 2x)$$

$$\therefore \Rightarrow f(x_n) = \sec x_n [R \cos x_n + \sin x_n]$$

$$f(x_n) = \tan x_n + R$$

$$\cancel{f(x) = \tan x + R} \quad f(x) = \tan x + R$$

(b)

To solve for x given R

$$x = \tan^{-1}(R).$$