Solve the following equation by using secant method

$x \cos x - 2x^2 + 3x - 1 = 0 \qquad 0.2 \le x \le 0.3$

Sol:-

$f(x) = x \cos x - 2x^2 + 3x - 1$

$x_0 = 0.2$

$x_1 = 0.3$

$$x_{n+1} = x_n - \frac{[x_n - x_{n-1}]\, f(x_n)}{f(x_n) - f(x_{n-1})}$$

Let $n = 1$

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

$f(0.2) = -0.28399 \qquad f(0.3) = 0.0066$

$$x_2 = (0.3) - \frac{(0.3 - 0.2)(-0.28399)}{0.0066 - (-0.28399)}$$

$x_2 = 0.29773$

$n = 2$

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

$x_1 = 0.3 \qquad f(x_1) = 0.0066$

$x_2 = 0.29773 \qquad f(x_2) = 0.00054$

$$x_3 = 0.29773 - \frac{(0.29773 - 0.3)(0.00054)}{(0.00054) - (0.0066)}$$

$= 0.29753$

n	x_{n-1}	$f(x_{n-1})$	x_n	$f(x_n)$	x_{n+1}	$f(x_{n+1})$
1	0.2	-0.29377	0.3	0.0066	0.29773	0.00054
2	0.3	0.0066	0.29773	0.00054	0.29753	0.00001