

TI-84+ Lab 14 For Mathematics 224

Topics: Newton's method

Newton's method. Find zero of function $f(x) = -3x^2 + 2x + 1$ in interval $[-1, 0]$ using Newton's method.

- *derivative*

$$f'(x) = -3(2)x^{2-1} + 2(1)x^{1-1} = -6x + 2$$

$$\text{let } Y_1 = -3X^2 + 2X + 1, Y_2 = -6X + 2$$

- let initial guess be $c_1 = -1$, so

$$c_2 = c_1 - \frac{f(c_1)}{f'(c_1)} = -1 - \frac{f(-1)}{f'(-1)} = -1 - \frac{-3(-1)^2 + 2(-1) + 1}{-6(-1) + 2} = -0.5$$

$$-1 \rightarrow X \text{ and } X - Y_1/Y_2 \rightarrow X$$

- using guess $c_2 = -0.5$

$$c_3 = c_2 - \frac{f(c_2)}{f'(c_2)} = -0.5 - \frac{f(-0.5)}{f'(-0.5)} = -0.5 - \frac{-3(1.3)^2 + 2(1.3) + 1}{-6(1.3) + 2} = -0.35$$

$$X - Y_1/Y_2 \rightarrow X$$

- using guess $c_3 = -0.35$

$$c_4 = c_3 - \frac{f(c_3)}{f'(c_3)} \approx -0.35 - \frac{f(-0.35)}{f'(-0.35)} \approx -0.35 - \frac{-3(-0.35)^2 + 2(-0.35) + 1}{-6(-0.35) + 2} \approx -0.334$$

$$X - Y_1/Y_2 \rightarrow X$$