

## Newton's Method Example

Ti-83/84

**Problem:** Use Newton's Method to determine the root of  $f(x) = x^3 - 4x - 1 = 0$  that lies between 2 & 3.

$$\text{Newton's Method: } x_{n+1} = x_n - \frac{f(x_n)}{f'(x_n)}$$

Note: type the function as Y1: Press: Y1 then  $x^3 - 4x - 1$

To use whatever is entered in Y1 inside a formula type:

Vars:  $\rightarrow$  : Enter: Enter if your equation is enter as Y1.

To access nDeriv, press math: 8:

a) In this example we will use  $x_1 = 2.5$  as our initial guess. So :

**press:** 2.5 : STO: x,†,θ,n: Enter

b) We will now type Newton's Method on the screen and then store this expression as x, in effect creating a loop.

**Press:** x-var : Y1: nDeriv(Y1,x,x): sto> : x-var: Enter

As soon as you press Enter you get the second approximation

$X_2 = 2.186440699$ , then each time you press enter you get another approximation.

$$X_3 = 2.118117696$$

$$X_4 = 2.114914461$$

$$X_5 = 2.114907542$$

$$X_6 = 2.114907541$$

$$X_7 = 2.114907541 = X_6$$

Done!

