3)a) $f(x) = x^3 + 4x^2 - 10$ $\quad x_0 = 1.5 \quad (1,2)$ interval

$x_{i+1} = x_i - \dfrac{f(x_i)}{f'(x_i)}$ $\quad f'(x) = 3x^2 + 8x$

$$x_1 = 1.5 - \frac{(1.5)^3 + 4(1.5)^2 - 10}{3(1.5)^2 + 8(1.5)} = 1.37333$$

$$x_2 = 1.37333 - \frac{(1.37333)^3 + 4(1.37333)^2 - 10}{3(1.37333)^2 + 8(1.37333)} = 1.36526$$

$$x_3 = 1.36526 - \frac{(1.36526)^3 + 4(1.36526)^2 - 10}{3(1.36526)^2 + 8(1.36526)} = 1.36523$$

$$x_4 = 1.36523 - \frac{(1.36523)^3 + 4(1.36523)^2 - 10}{3(1.36523)^2 + 8(1.36523)} = 1.36523$$

convergence occurred at x_4

3)b) $|x_n - r| / |x_{n-1} - r|^2$ $f''(x) = 6x+8$

at $x_1 = 1.37333$

$|1.37333 - r| / |1.5 - r|^2 = 0.44596$

$|6(1.37333) + 8 / 2(3(1.37333)^2 + 8(1.37333))|$

$= 0.48784$

at $x_2 = 1.36526$

$|1.36526 - r| / |1.37333 - r|^2 = 0.45724$

$|6(1.36526) + 8 / 2(3(1.36526)^2 + 8(1.36526))|$

$= 0.49024$

at $x_3 = 1.36523$

$|1.36523 - r| / |1.36526 - r|^2 = 0.4875$

$|6(1.36523) + 8 / 2(3(1.36523)^2 + 8(1.36523))|$

$= 0.49024$