Problem 2

a)

$$f'(0) = \frac{-4.01+4*2.05-3*0.37}{2*2} = 1.01975 = 0.77$$

b)

$$f'(0) = \frac{-2.05+4*1.14-3*0.37}{2*1} = 1.1995 = 0.7$$

c)

$$f_i' = \frac{f_{i+1}+f_{i-1}}{2h} = \frac{f_{i+1}-f_{i-1}}{2h}$$

$$f'(0) = \frac{2.05-0.72}{2*2} = 0.04945 = 0.3325$$

Problem 4

$a = 1\ b = 2\ c = 3$ $\qquad\qquad$ $a = 2\ b = 0\ c = 4$

Problem 5

b) 1st iteration: i=0;

$$\begin{cases} y(0.1) = y(0) + \left[\frac{f(0,1)+f(0.1,y_1^*)}{2}\right]0.1 \\ y_1^* = y(0) + f(0.1,1)0.1 = 1 + 0 = 1 \end{cases} \qquad \begin{cases} y(0.1) = y(0) + \left[\frac{f(0,1)+f(0.1,y_1^*)}{2}\right]0.1 \\ y_1^* = y(0) + f(0,1)0.1 = 1 + 0 = 1 \end{cases}$$

Problem 6

$point(1,1)$

i=1;j=1;n=0;

$$T_{1,1}^{(1)} = 5 + 0.1(0.5 * [5 - 2 * 5 + 20] + 0.5 * [5 - 2 * 5 + 10] + 0.5 * 5)$$

$$T_{1,1}^{(1)} = 5 + 0.1(0.5 * [5 - 2 * 5 + 10] + 0.5 * [5 - 2 * 5 + 20] + 0.5 * 5)$$

Assignment #5 - Solutions - Corrections

$point(1,2)$

i=1;j=2;n=0;

$$T_{1,2}^{(1)} = T_{1,2}^{(0)} + 0.1\left(0.5\left[T_{2,2}^{(0)} - 2T_{1,2}^{(0)} + 20\right] + 0.5\left[30 - 2T_{1,2}^{(0)} + T_{1,1}^{(0)}\right] + 0.5T_{1,2}^{(0)}\right)$$

$$T_{1,2}^{(1)} = T_{1,2}^{(0)} + 0.1\left(0.5\left[T_{2,2}^{(0)} - 2T_{1,2}^{(0)} + 10\right] + 0.5\left[40 - 2T_{1,2}^{(0)} + T_{1,1}^{(0)}\right] + 0.5T_{1,2}^{(0)}\right)$$