ASSIGNMENT: -05

EECE: -212

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Level: 2

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Here are some mathematical problem are solved by MATLAB 2020a.according to the questions. The answers are given bellow:

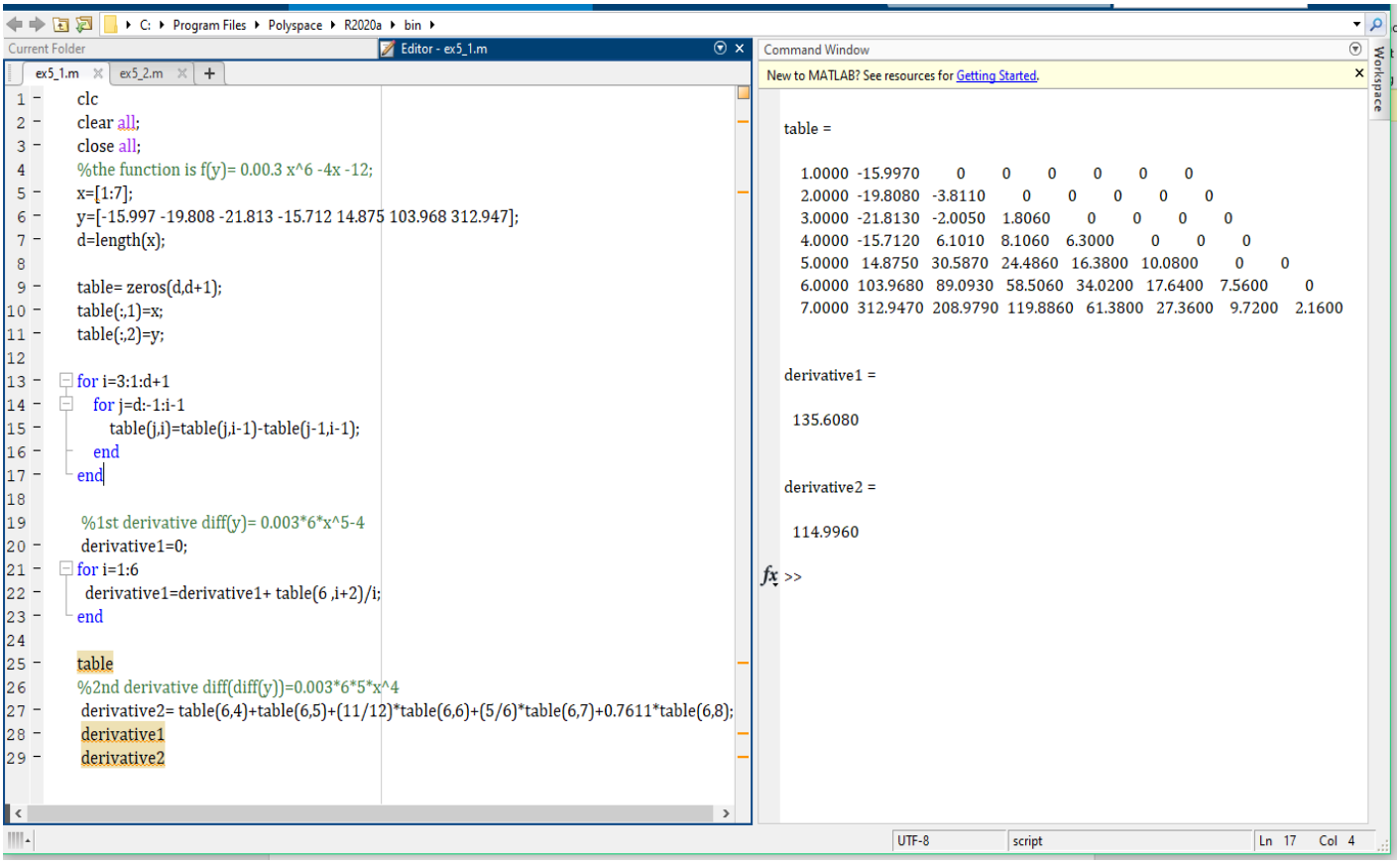
Question:

(x, y) = (1, -15.997), (2, -19.808), (3, -21.813), (4, -15.712), (5,14.875), (6,103.968), (7, 312.947) Find the first and second derivative of the interpolated curve at x = 6 and x = 7. Use backward difference method.

Solution:

Here given some value of a function=(0.00.3 x^6 -4x -12) against the value of x. Now I have to find the 1st derivative and 2nd derivative of the interpolated curve at x=6 & x=7.The programs are given bellow.

When x=6:



Here,

1st derivative is 135.6080

2nd derivative is 114.9960

Here point to be noted that in backward function, in the decreasing of the value of x the accuracy of the value is also decreased.

So, when x=6

The value of 1st derivate is 135.6080.

But,

The accurate value is:

diff(.003*x^6-4*x-12);

= 0.003*6*x^5-4
=135.968.

The accuracy is: $\frac{\mathbf{135.6080}}{\mathbf{135.968}}\boldsymbol{x}\mathbf{100} = \mathbf{99.73}\%$

Again, the value of 2nd derivative is 114.9960.

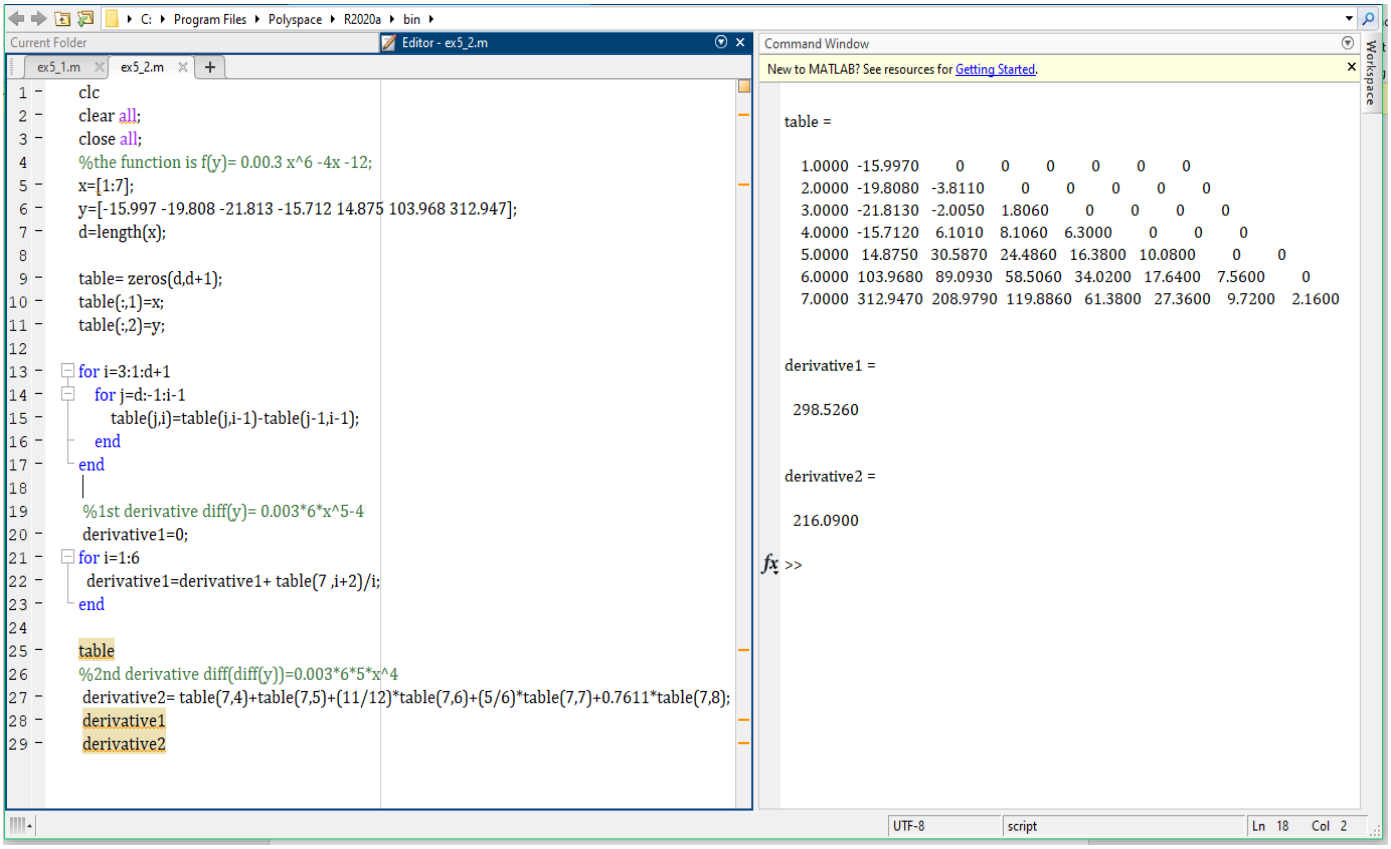
But,

The accurate value is:

diff (diff (0.00.3 x^6 -4x -12))
=0.003*6*5*x^4
=116.64

The accuracy is: $\frac{\mathbf{114.9960}}{\mathbf{116.64}}\boldsymbol{x}\mathbf{100} = \mathbf{98.59}\%$

When x=7:



Here,

1st derivative is 298.5260

2nd derivative is 216.0900

As x=7 is the last value of backward function so it is fully accurate is the program value.