Class_assignment_12

1. Determine the solution of the equation:

   $\cos(x)=2x^3$

2. Determine the first three positive roots of the equation:

   $2\sin(x)-\sqrt{x}=-2.5$

3. Find t he minimum and maximum points of the function described at 2.

4. Given the function $f(x)=\sqrt{x}+5\sin(x)$ do the following:

a. Find the area between the curve of *f(x)* and the ***x*** axis in the range $1\leq x\leq 14$ (note: the function crosses the ***x*** axis).

b. Display the calculated area value in the Command window:

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'The area is ___'
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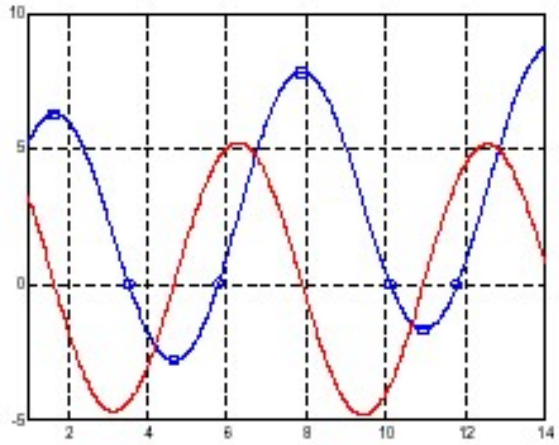
c. Calculate *f(x)* zeros, maximum and minimum locations in the range $1\leq x\leq 14$

d. Plot the graph of *f(x)* as solid blue curve, mark the function's zeros as circles, maximum and minimum locations as squares.

e. Find *df/dx* (the first derivative of *f*(*x*)) numerically or symbolically, and add the graph of *df/dx* to the same figure as solid red curve.

The final graph should look like this:



5. Write a user-defined function *uniqsol* that finds all unique solutions (without repetitions) of a given mathematical function *f (x)* within a given range between *xmin* and *xmax*.

a. (5%) The function receives 3 input arguments:

f – the mathematical function *f(x)* given as a string.

xmin – the low range boundary value.

xmax – the high range boundary value.

The function returns 2 output arguments:

xo – a vector containing all unique solutions of *f(x)* in the range **between *xmin* and *xmax*.**

nx - a number of unique solutions the function found in the range.

The user-defined function *uniqsol* should execute the following stages:

b. (5%) Find all *f(x)* solutions in the range. Assume that the smallest distance between two consecutive solutions is 0.2.

c. (5%) Round up the found solutions up to the second digit value (i.e. the solution 4.856874 will be rounded to 4.86).

d. (10%) Eliminates all 'doubled' (repeated) solutions keeping only the unique solutions values (i.e. if the solution 4.86 was found 6 times all its reoccurrences are eliminated and only one solution of 4.86 is kept for the output). All unique solution values are stored and returned in vector *xo*.

e. (5%) Calculate how many unique solution of function *f(x*) in the range were found (output argument *nx*).