Assignment 3 Solutions

Aaron Cahn
University of Wisconsin-Madison
cahn@cs.wisc.edu

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1 Solutions

1.1 Question 1

Listing 1: Matlab Commands

```
function [P] = find_vectors(m, n, s)

    % create the x and y ranges
    x=(1:m);
    y=(1:n);

    % create the meshgrid (x,y) coordinates
    [X,Y]=meshgrid(x,y);

    % create (x,y) pairs in form [j;k]
    A=[X(:)';Y(:)'];

    % solve each s*[p;o]=[j;k] for all [j;k]
    B=s\A;

    % find columns with integer solutions
    cols=all(mod(B,1)==0);

    % return [j;k]'s with integer [p;o]'s
    P=A(:,cols);
end
```

1.1.1 Part A

Listing 2: Matlab Commands

```
s=[2,0;0,2];
find_vectors(4,6,s)

ans =

     2     2     2     4     4     4
     2     4     6     2     4     6
```

1.1.2 Part B

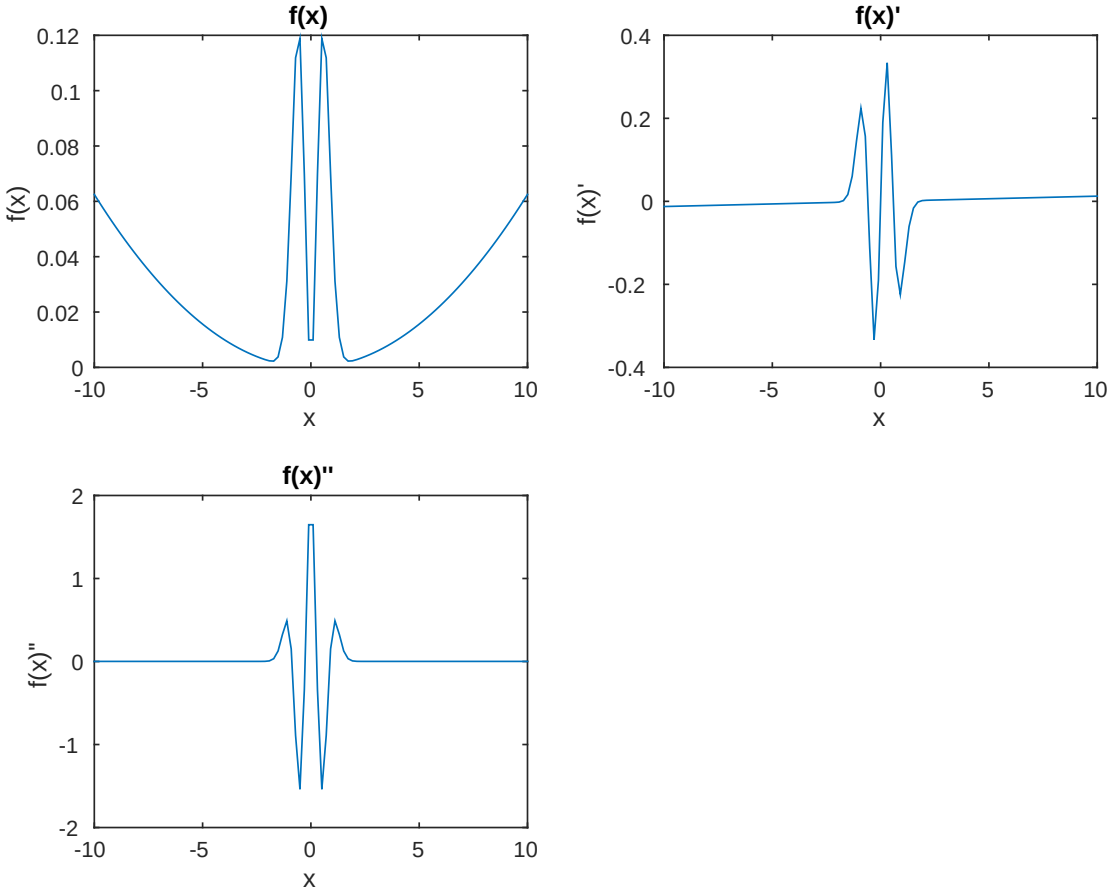
Listing 3: Matlab Commands

```
s=[1,1;1,-1];
find_vectors(5,6,s)

ans =

  1     1     1     2     2     2     3     3     3     4     4     4     5     5     5
  1     3     5     2     4     6     1     3     5     2     4     6     1     3     5
```

1.2 Question 2



Listing 4: Matlab Commands

```
% max/min for f(x)
x(find(yi(x)==max(yi(x))))
ans =

    -0.5051    0.5051

x(find(yi(x)==min(yi(x))))
ans =

    -1.7172    1.7172
```

1.3 Question 3

1.3.1 Part C

1.3.2 Part D

1.3.3 Part E

1.4 Question 4

1.4.1 Part A

1.4.2 Part B

1.4.3 Part C

1.5 Question 5

1.5.1 Part A

1.5.2 Part B

1.5.3 Part C

1.5.4 Part D

1.6 Question 6