Assignment 0 Solutions

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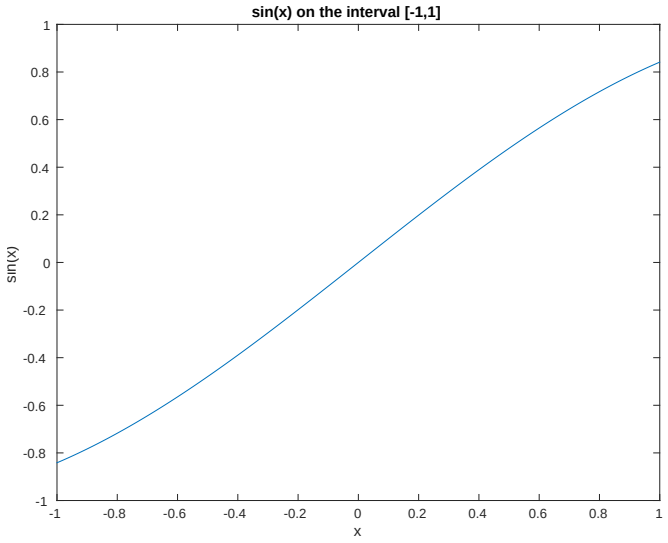
1 Solutions

1.1 Question 1

Listing 1: Matlab Commands

```
figure
plot([-1:.01:1],sin([-1:0.01:1]))
title('sin(x) on the interval [-1,1]')
xlabel('x')
ylabel('sin(x)')
print -dpdf a0_q1.pdf
```



1.2 Question 2

Listing 2: Matlab Commands

```
A = eye(20);
A(1,1:19) = 1;
A(20,1:20) = 1;
A(1:20) = 1;
B = zeros(20,1);
B(1,1) = 17;
A\B
```

$$x = \begin{pmatrix} -1.0000 \\ 1.0000 \\ 1.0000 \\ 1.0000 \\ 1.0000 \\ 1.0000 \\ 1.0000 \\ 1.0000 \\ 1.0000 \\ 1.0000 \\ 1.0000 \\ 1.0000 \\ 1.0000 \\ 1.0000 \\ 1.0000 \\ 1.0000 \\ 1.0000 \\ 1.0000 \\ 1.0000 \\ -17.0000 \end{pmatrix} \tag{1}$$

1.3 Question 3

Listing 3: ssolve functions

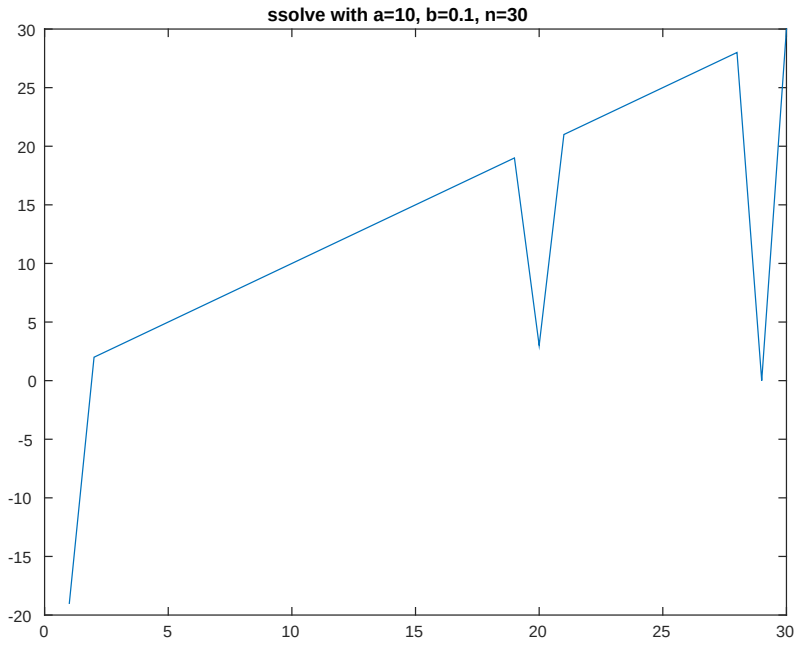
```
function x = ssolve(a, b, n)
A = eye(n);
A(1,2) = a;
A(20,1:19) = b;
B = (1:n)';
B(n-1,1) = 0;
x = A\B;
```

1.4 Question 4

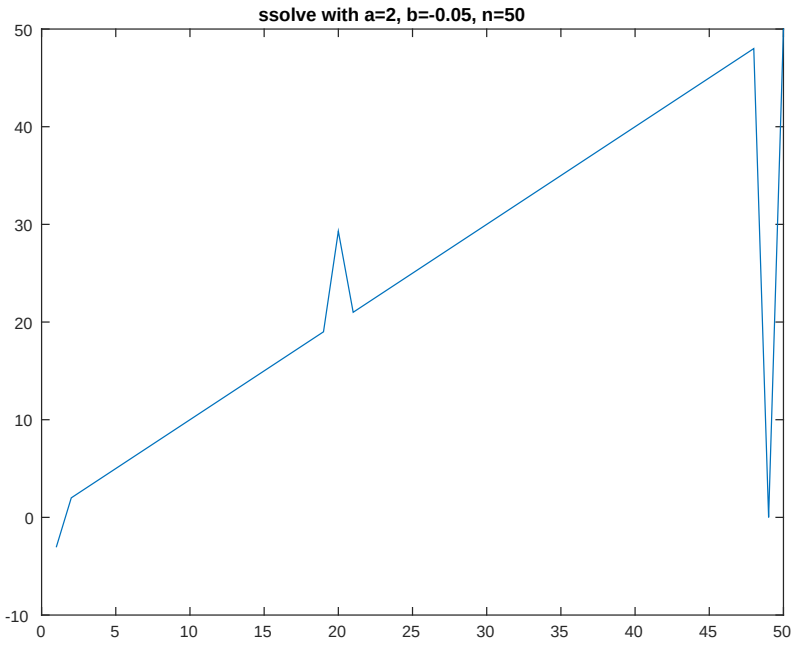
Listing 4: Matlab Commands

```
ret = ssolve(10, 0.1, 30);
figure
plot(ret)
title('ssolve with a=10, b=0.1, n=30')
print -dpdf a0_q4_a.pdf

clear all

ret = ssolve(2, -0.05, 50);
figure
plot(ret)
title('ssolve with a=2, b=-0.05, n=50')
print -dpdf a0_q4_b.pdf
```

1.4.1 Part A


ssolve with a=10, b=0.1, n=30
30
25
20
15
10
5
0
-5
-10
-15
-20
0
5
10
15
20
25
30

1.4.2 Part B


ssolve with a=2, b=-0.05, n=50
50
40
30
20
10
0
-10
0
5
10
15
20
25
30
35
40
45
50