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CS 455
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Homework 2

1.
    a. Computed Sigma Norms:
        i. Sigma Norm of [3 5] - [7 5] = 6.1245
        ii. Sigma Norm of [2 8] - [4 5] = 5.1658
    b. Sigma Norm Function (Full Testing Code Attached):

```
function s = snorm(x, e)
s = (1/e) * (sqrt(1 + (e * (norm (x))^2)) - 1);
end
```

2.
    a. Sigma Norm vs Euclidean Norm (Assigned Values):

Input	Sigma Norm	Euclidean
[3 5] - [7 5] = [-4 0]	6.1245	4
[2 8] - [4 5] = [-2 3]	5.1658	3.6056

    b. Sigma Norm vs Euclidean Norm (Test Values):

Input	Sigma Norm	Euclidean
2	1.8322	2
[0 0]	0	0
[3 5 7]	20.4959	9.1104

Homework Code:

```
%Constants
e = 0.1; %Epsilon of Sigma Norm

%Qi and Qj for the first pair of vectors
a1 = [3 5];
a2 = [7 5];

%Qi and Qj for the second pair of vectors
b1 = [2 8];
b2 = [4 5];

%i,j are the sigma norms of their respective vectors
i = snorm (a2 - a1, e)
j = snorm (b2 - b1, e)

%k,l are the euclidean norms of their respective vectors
k = norm (a2 - a1)
l = norm (b2 - b1)

function s = snorm(x, e)
s = (1/e) * (sqrt(1 + (e * (norm (x))^2)) - 1);
end
```