MATH 245 ? Computational Mathematics ? Project 1

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1.0.1 Question 1

Compute the sum of vector x using a for loop:

$$s_1 = \sum_{i=1}^{5} x_i$$

[1]:
```
x = [0.1, 1.3, -1.5, 0, 12.3]
s1 = 0
for i in x:
    s1 += i
print("s1 = {}".format(s1))
```

```
s1 = 12.200000000000001
```

Compute the sum of vector x^2 using a for loop:

$$s_2 = \sum_{i=1}^{5} x_i^i$$

[18]:
```
x = [0.1, 1.3, -1.5, 0, 12.3]
s2 = 0

for i in range(5):
    s2 += (x[i]**i)
print("s2 = {}".format(s2))
```

```
s2 = 22893.214100000005
```

Find the max value of vector x using a for loop:
$M = max\{|x_i|, 1, 2, ..., 5\}$

[19]:
```
x = [0.1, 1.3, -1.5, 0, 12.3]
max = float('-inf')
for i in x:
    if (abs(i) > max):
        max = abs(i)
```

```
print("M = {}".format(max))
```

```
M = 12.3
```

Find the min value of vector x using a for loop:
$m = min\{|x_i|, 1, 2, ..., 5\}$

[20]:
```
x = [0.1, 1.3, -1.5, 0, 12.3]
min = float('inf')
for i in x:
    if (abs(i) < min):
        min = abs(i)

print("m = {}".format(min))
```

```
M = 0
```

Compute the sum, max, and min of vector x using built in python functions:

[2]:
```
x = [0.1, 1.3, -1.5, 0, 12.3]
print("sum calculated function = {}".format(sum(x)))
print("max calculated function = {}".format(max(map(abs,x))))
print("min calculated function = {}".format(min(map(abs,x))))
```

```
sum = 12.200000000000001
max = 12.3
min = 0
```

It can be seen that when we calculate the sum, max, or min using the built in python functions, we get the exact same values as we would when calculating them manually with loops.

1.0.2 Question 2

[ ]:
```

```