Homework 1

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0.1 Using R: Vectors

0.1.1 (a)

Create a vector with 10 numbers (3, 12, 6, -5, 0, 8, 15, 1, -10, 7) and assign it to x.

```
x <- c(3, 12, 6, -5, 0, 8, 15, 1, -10, 7)
```

0.1.2 (b)

Using the commands seq, min, and max with one line of code create a new vector y with 10 elements ranging from the minimum value of x to the maximum value of x.

```
# Min, max of x vector
xMin = min(x)
xMax = max(x)
INCREMENT = (xMax - xMin) / (length(x) - 1) # size of each step

# Create the vector from min of x to max of x while maintaining length of 10
y = seq(min(x), max(x), INCREMENT)
y # display
```

```
 [1] -10.000000  -7.222222  -4.444444  -1.666667   1.111111   3.888889
 [7]   6.666667   9.444444  12.222222  15.000000
```

```
# Prove is 10 elements:
length(y)
```

```
[1] 10
```

0.1.3 (c)

Compute the sum, mean, standard deviation, variance, mean absolute deviation, quartiles, and quintiles for x and y.

0.1.4 (d)

Use sample() to create a new 7 element vector z by using R to randomly sample from x with replacement.

0.1.5 (e)

Use t.test() to compute a statistical test for differences in means between the vectors x and y. Are the differences in means significant?

0.1.6 (f)

To sort a data frame in R, use the order() function. Sort the vector x and re-run the t-test as a paired t-test.

0.1.7 (g)

Create a logical vector that identifies which numbers in x are negative.

0.1.8 (h)

Use this logical vector to remove all entries with negative numbers from x. (Make sure to overwrite the vector x so that the new vector x has 8 elements!)