1.

a.

$axp

	X..newX..i
nobs	2515.000000
NAs	0.000000
Minimum	-17.594900
Maximum	17.926600
1. Quartile	-1.111050
3. Quartile	1.092900
Mean	0.014565
Median	-0.018200
Sum	36.631900
SE Mean	0.048778
LCL Mean	-0.081084
UCL Mean	0.110215
Variance	5.983984
Stdev	2.446218
Skewness	-0.034606
Kurtosis	6.048051

$cat

	X..newX..i
nobs	2515.000000
NAs	0.000000
Minimum	-14.517500
Maximum	14.722900
1. Quartile	-1.144150
3. Quartile	1.206100
Mean	0.059504
Median	0.048900
Sum	149.651700
SE Mean	0.043263
LCL Mean	-0.025332
UCL Mean	0.144339
Variance	4.707373
Stdev	2.169648
Skewness	0.011671
Kurtosis	4.453264

$sbux

	X..newX..i
nobs	2515.000000
NAs	0.000000
Minimum	-28.286200
Maximum	14.635400
1. Quartile	-1.247450
3. Quartile	1.248750
Mean	0.048054
Median	-0.051200
Sum	120.855000
SE Mean	0.053492
LCL Mean	-0.056840
UCL Mean	0.152947
Variance	7.196460
Stdev	2.682622
Skewness	-0.082427
Kurtosis	8.745578

b. Done in r Code

c.

$axp

	X..newX..i
nobs	2515.000000
NAs	0.000000
Minimum	-19.352286
Maximum	16.489221
1. Quartile	-1.117268
3. Quartile	1.086971
Mean	-0.015434
Median	-0.018202
Sum	-38.817035
SE Mean	0.048911
LCL Mean	-0.111345
UCL Mean	0.080477
Variance	6.016709
Stdev	2.452898
Skewness	-0.336435
Kurtosis	6.486498

$cat

	X..newX..i
nobs	2515.000000
NAs	0.000000
Minimum	-15.685851
Maximum	13.734947
1. Quartile	-1.150746
3. Quartile	1.198885
Mean	0.035949
Median	0.048888
Sum	90.411139
SE Mean	0.043300
LCL Mean	-0.048958
UCL Mean	0.120856
Variance	4.715337
Stdev	2.171483
Skewness	-0.201745
Kurtosis	4.694747

$sbux

	X..newX..i
nobs	2515.000000
NAs	0.000000
Minimum	-33.248699
Maximum	13.658647
1. Quartile	-1.255296
3. Quartile	1.241017
Mean	0.011885
Median	-0.051213
Sum	29.891717
SE Mean	0.053757
LCL Mean	-0.093527
UCL Mean	0.117297
Variance	7.267811
Stdev	2.695888
Skewness	-0.597068
Kurtosis	12.895473

d.

$axp

One Sample t-test

data: newX[, i]
t = -0.31555, df = 2514, p-value = 0.7524

$cat

One Sample t-test

data: newX[, i]
t = 0.83023, df = 2514, p-value = 0.4065

$sbux

One Sample t-test

data: newX[, i]
t = 0.2211, df = 2514, p-value = 0.825

All three p-values are greater than 0.05 so fail to reject the null hypothesis for all means

2.

a.

$gm

	X..newX..i
nobs	408.000000
NAs	0.000000
Minimum	-38.931300
Maximum	27.661900
1. Quartile	-4.348825
3. Quartile	5.450150
Mean	0.556755
Median	0.678100
Sum	227.156000
SE Mean	0.459067
LCL Mean	-0.345684
UCL Mean	1.459194
Variance	85.983038
Stdev	9.272704
Skewness	-0.383475
Kurtosis	2.048076

$vw

	X..newX..i
nobs	408.000000
NAs	0.000000
Minimum	-22.536300
Maximum	14.160000
1. Quartile	-1.583500
3. Quartile	3.995300
Mean	1.011799
Median	1.387950
Sum	412.813800
SE Mean	0.223153
LCL Mean	0.573122
UCL Mean	1.450475
Variance	20.317313
Stdev	4.507473
Skewness	-0.742662
Kurtosis	2.666032

$ew

	X..newX..i
nobs	408.000000
NAs	0.000000
Minimum	-27.224800
Maximum	29.926000
1. Quartile	-1.684150
3. Quartile	4.564425
Mean	1.331385
Median	1.617200
Sum	543.204900
SE Mean	0.277038
LCL Mean	0.786780
UCL Mean	1.875989
Variance	31.314081
Stdev	5.595899
Skewness	-0.300123
Kurtosis	4.333664

$sp

	X..newX..i
nobs	408.000000
NAs	0.000000
Minimum	-21.763000
Maximum	13.176700
1. Quartile	-1.762400
3. Quartile	3.598425
Mean	0.730084
Median	1.003550
Sum	297.874400
SE Mean	0.215849
LCL Mean	0.305767
UCL Mean	1.154402
Variance	19.008981
Stdev	4.359929
Skewness	-0.570545
Kurtosis	2.268600

b. Done in R code

c.

$gm

	X..newx..i
nobs	408.000000
NAs	0.000000
Minimum	-49.317073
Maximum	24.421518
1. Quartile	-4.446221
3. Quartile	5.306814
Mean	0.110182
Median	0.675811
Sum	44.954256
SE Mean	0.474789
LCL Mean	-0.823164
UCL Mean	1.043528
Variance	91.973391
Stdev	9.590276
Skewness	-1.023664
Kurtosis	4.020752

$vw

	X..newx..i
nobs	408.000000
NAs	0.000000
Minimum	-25.536075
Maximum	13.243079
1. Quartile	-1.596172
3. Quartile	3.917552
Mean	0.904567
Median	1.378403
Sum	369.063338
SE Mean	0.225783
LCL Mean	0.460721
UCL Mean	1.348413
Variance	20.798939
Stdev	4.560585
Skewness	-1.051001
Kurtosis	3.937548

$ew

	X..newx..i
nobs	408.000000
NAs	0.000000
Minimum	-31.779495
Maximum	26.179487
1. Quartile	-1.698497
3. Quartile	4.463320
Mean	1.166997
Median	1.604263
Sum	476.134773
SE Mean	0.278528
LCL Mean	0.619465
UCL Mean	1.714529
Variance	31.651673
Stdev	5.625982
Skewness	-0.836133
Kurtosis	5.242452

$sp

	X..newx..i
nobs	408.000000
NAs	0.000000
Minimum	-24.542750
Maximum	12.378013
1. Quartile	-1.778115
3. Quartile	3.535194
Mean	0.631937
Median	0.998548
Sum	257.830396
SE Mean	0.217942
LCL Mean	0.203505
UCL Mean	1.060369
Variance	19.379422
Stdev	4.402206
Skewness	-0.854843
Kurtosis	3.334693

d.

```
$gm

        One Sample t-test

data:  newx[, i]
t = 0.23206, df = 407, p-value = 0.8166
```

```
$vw

        One Sample t-test

data:  newx[, i]
t = 4.0064, df = 407, p-value = 7.332e-05
```

```
$ew

        One Sample t-test

data:  newx[, i]
t = 4.1899, df = 407, p-value = 3.425e-05
```

```
$sp

        One Sample t-test

data:  newx[, i]
t = 2.8996, df = 407, p-value = 0.003939
```

GM:

Null Hypothesis: Mean = 0

Alternate Hypothesis: Mean ≠ 0

P-val is greater than 0.05 so fail to reject the null hypothesis. There isn't enough evidence to conclude the mean is significantly different than 0.

VW:

Null Hypothesis: Mean = 0

Alternate Hypothesis: Mean ≠ 0

P-val is less than 0.05 so reject the null hypothesis. Conclude the mean is significantly different from 0.

EW:

Null Hypothesis: Mean = 0

Alternate Hypothesis: Mean ≠ 0

P-val is less than 0.05 so reject the null hypothesis. Conclude the mean is significantly different from 0.

S&P:

Null Hypothesis: Mean = 0

Alternate Hypothesis: Mean ≠ 0

P-val is less than 0.05 so reject the null hypothesis. Conclude the mean is significantly different from 0.

3.

a. Annual Log Return = 0.07583247
b. Investment Value = $13.17

4.

a. Null Hypothesis: Skewness = 0, Alternate Hypothesis: Skewness ≠ 0

Z-Score = 1.96, Test Statistic = -6.88, 6.88 > 1.96

Reject the null hypothesis and conclude the skewness is significantly different from zero.

b. Null Hypothesis: Kurtosis = 0, Alternate Hypothesis: Kurtosis ≠ 0

Z-Score = 1.96, Test Statistic = 66.40, 66.40 > 1.96

Reject the null hypothesis and conclude the kurtosis is significantly different from zero.