

# MATH 3080 Lab Project 1

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Remember: I expect to see commentary either in the text, in the code with comments created using `#`, or (preferably) both! **Failing to do so may result in lost points!**

## Problem 1

(a) Take every 3rd element of the speed vector in the `cars` dataset.

(b) Make a 95% confidence interval of the mean of this new data. Sigma is unknown. Put the histogram and boxplot of the new data in the same window.

```
# Your code here normal distribution, sigma unknown caculate mean, standard
# derivation
n = length(cars$speed)
meanspeed = mean(cars$speed)
sd = sd(meanspeed)

normal_sample = cars$speed[c(3, 6, 9, 12, 15, 18, 21, 24, 27, 30, 33, 36, 39,
  42, 45, 48)]
normal_sample
```

```
## [1] 7 9 10 12 12 13 14 15 16 17 18 19 20 20 23 24
```

```
sample_mean = mean(normal_sample)
sample_sd = sd(normal_sample)
tstar = qt(0.025, n - 1)

(UC <- sample_mean + tstar * (sample_sd/sqrt(n)))
```

```
## [1] 14.15496
```

```
(LC <- sample_mean - tstar * (sample_sd/sqrt(n)))
```

```
## [1] 16.97004
```

```
# another way/just run
t.test(normal_sample, conf.level = 0.95) # add $conf.int to print CI only
```

```
##
## One Sample t-test
##
## data: normal_sample
## t = 12.569, df = 15, p-value = 2.289e-09
## alternative hypothesis: true mean is not equal to 0
## 95 percent confidence interval:
## 12.9234 18.2016
## sample estimates:
## mean of x
## 15.5625
```

```
# graph
par(mfrow = c(1, 2))
boxplot(normal_sample)
hist(normal_sample)
```

