HW 5

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5.6

```
pop1 <- 65
pop2 <- 77
n <- 25
samplemean <- (pop1+pop2)/2
cat("Sample Mean is = ", samplemean, "\n")
```

```
## Sample Mean is =  71
```

```
MarginError <- (pop2-pop1)/2
cat("Margin of error = ", MarginError, "\n")
```

```
## Margin of error =  6
```

```
df <- 25-1
t <- qt(.95, df)

sd <- (MarginError/t)*5
cat("Sample Standard Deviation = ", sd, "\n")
```

```
## Sample Standard Deviation =  17.53481
```

5.14

a)

```
z <- 1.65 #90% CI
me <- 25
sd <- 250
raina <- round(((z*sd)/me)^2, 0)
cat("Raina should collect a sample size of = ", raina, "\n")
```

```
## Raina should collect a sample size of =  272
```

b)

Luke's sample size should be larger, with a 99% confidence interval since his `z` score will be larger and that will make the result of multiplying by the SD larger.

c)

```
z <- 2.58 #99% CI
me <- 25
sd <- 250
luka <- round(((z*sd)/me)^2,0)
cat ("Minimum required sample size for luka is = ", luka, "\n")
```

```
## Minimum required sample size for luka is =  666
```

5.20

a)

There does not seem to be a clear difference in the average reading and writing scores

b)

The reading and writing scores of each student are independent of each other

c)

H0:μ(reading) – μ(writing) = 0

HA:μ(reading) – μ(writing) ≠ 0

d)

The obersvations are independent and the distrubtion is normal with no skew.

e)

```
mu <- -.545
df <- n-1
SD <- 8.887
n <- 200

SE <- SD/sqrt(n)

t <- (mu-0)/SE

p <- pt(t, df)
cat (p)
```

```
## 0.1971904
```

The p-value is greater than 0.05 so we cannot to reject the null hypothesis. There is no convincing evidence that of a difference between the average reading and writing exam scores.

f)

We might have made a Type II error in rejecting the alternative hypothesis and wrongly concluded that there is no a difference in the average reading and writing scores.

g)

Conclusion: There is no difference we would expect 0 to be in our confidence interval.

5.32

H0:μOfAuto−μOfmanual = 0

HA:μOfAuto−μOfmanual ≠ 0

```
n <- 26

SDauto <- 3.58
SDmanual <- 4.51

mdiff <- 16.12 - 19.85

SEauto <- SDauto/sqrt(n)
SEmanual <- SDmanual/sqrt(n)

SE <- sqrt(((SEauto)^2)+(SEmanual)^2)
T <- (mdiff-0)/SE
p <- pt(T, n-1)
p <- 2*p
cat(p)
```

```
## 0.002883615
```

The p-value is less than 0.05 so we can reject the null hypothesis. There is convincing evidence that the difference in the average city MPG of automatic and manual vehicles.

5.48

a)

H0:μlessHS=μHS=μjrcol=μBach=μGrad

HA:AtLeastOneMeanIsNotEqual

End of this file