Homework5

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3/23/2020

9.37)

a.

```
chart <- matrix(c(51, 6, 57, 12, 5, 17, 4, 1, 5, 67, 12, 79), ncol = 3, byrow = TRUE)
colnames(chart) <- c("Sampled Claims", "Not Allowed", "Marginal Total")
rownames(chart) <- c("Small", "Medium", "Large", "Marginal Total")
table <- as.table(chart)
chart
```

```
##                Sampled Claims Not Allowed Marginal Total
## Small                      51           6             57
## Medium                     12           5             17
## Large                       4           1              5
## Marginal Total             67          12             79
```

b.

```
"Small - "
```

```
## [1] "Small - "
```

```
6/57
```

```
## [1] 0.1052632
```

```
"Medium - "
```

```
## [1] "Medium - "
```

```
5/17
```

```
## [1] 0.2941176
```

```
"Large - "
```

```
## [1] "Large - "
```

```
1/5
```

```
## [1] 0.2
```

c. To perform a chi-squared significance test each data section must reacha minimal value. In this situation the Large has rows with data less than 5, so we must combine it with the Medium row.

```
chart <- matrix(c(51, 6, 57, 16, 6, 22, 67, 12, 79), ncol = 3, byrow = TRUE)
colnames(chart) <- c("Sampled Claims", "Not Allowed", "Marginal Total")
rownames(chart) <- c("Small", "Medium/Large", "Marginal Total")
table <- as.table(chart)
chart
```

```
##                Sampled Claims Not Allowed Marginal Total
## Small                      51           6             57
## Medium/Large               16           6             22
## Marginal Total             67          12             79
```

d. H_0 = The three strata claims are independent. H_A = The three strata claims are dependent.

e. Alpha = 0.05 df = 1

```
chart <- matrix(c(67*57/79, 12 * 57 / 79, 57, 67 * 22 / 79, 12 * 22 / 79, 22, 67, 12, 79), ncol = 3, by
colnames(chart) <- c("Sampled Claims", "Not Allowed", "Marginal Total")
rownames(chart) <- c("Small", "Medium/Large", "Marginal Total")
table <- as.table(chart)
chart
```

```
##                Sampled Claims Not Allowed Marginal Total
## Small                48.34177    8.658228             57
## Medium/Large         18.65823    3.341772             22
## Marginal Total       67.00000   12.000000             79
```

```
"X^2 = "
```

```
## [1] "X^2 = "
```

```
(((51 - 67*57/79)^2 / (67*57/79)) + ((6 - 12 * 57 / 79)^2 / (12 * 57 / 79)) + ((16 - 67 * 22 / 79)^2 /
```

```
## [1] 3.45551
```

```
pchisq((((51 - 67*57/79)^2 / (67*57/79)) + ((6 - 12 * 57 / 79)^2 / (12 * 57 / 79)) + ((16 - 67 * 22 / 7
```

```
## [1] 0.9369587
```

we got a value of .9369 from the chi-squared significance test. This value is greater than .05 so we fail to reject, so the three strata claims are independent.

9.38) a.

```
"Small - "
```

```
## [1] "Small - "
```

```
3342 * 6 / 57
```

```
## [1] 351.7895
```

```
"Medium - "
```

```
## [1] "Medium - "
```

```
246 * 5 / 17
```

```
## [1] 72.35294
```

```
"Large - "
```

```
## [1] "Large - "
```

```
58 * 1 / 5
```

```
## [1] 11.6
```

```
"Total - "
```

```
## [1] "Total - "
```

```
3342 * 6 / 57 + 246 * 5 / 17 + 58 * 1 / 5
```

```
## [1] 435.7424
```

b.

```
"at a confidence level of 95% the z-score is 1.96 and degrees of freedom of 4"
```

```
## [1] "at a confidence level of 95% the z-score is 1.96 and degrees of freedom of 4"
```

```
"Small Margin of Error - "
```

```
## [1] "Small Margin of Error - "
```

```
(6/57*51/57/57)^(1/2)*1.96
```

```
## [1] 0.07967178
```

```
"Medium Margin of Error - "
```

```
## [1] "Medium Margin of Error - "
```

```
(5/17*12/17/17)^(1/2)*1.96
```

```
## [1] 0.2165999
```

```
"Large Margin of Error - "
```

```
## [1] "Large Margin of Error - "
```

```
(1/5*4/5/5)^(1/2)*1.96
```

```
## [1] 0.3506155
```

9.50)

```
"Group 1 -"
```

```
## [1] "Group 1 -"
```

```
500 * pnorm(-.6)
```

```
## [1] 137.1266
```

```
"Group 2 -"
```

```
## [1] "Group 2 -"
```

```
500 * (pnorm(-.1) - pnorm(-.6))
```

```
## [1] 92.95952
```

```
"Group 3 -"
```

```
## [1] "Group 3 -"
```

```
500 * (pnorm(.1) - pnorm(-.1))
```

```
## [1] 39.82784
```

```
"Group 4 -"
```

```
## [1] "Group 4 -"
```

```r
500 * (pnorm(.6) - pnorm(.1))
```

```
## [1] 92.95952
```

```r
"Group 5 -"
```

```
## [1] "Group 5 -"
```

```r
500 * pnorm(.6, lower.tail=FALSE)
```

```
## [1] 137.1266
```

```r
"X^2 - "
```

```
## [1] "X^2 - "
```

```r
(((139-137)^2 / 137) + ( (102-93)^2 / 93 ) + ( (41-40)^2 / 40 ) + ( (78-93)^2 / 93 ) ) + ( (140-137)^2 /
```

```
## [1] 3.410213
```

```r
x <- c(139, 102, 41, 78, 140)
y <- chisq.test(x, p = c(pnorm(-.6),(pnorm(-.1) - pnorm(-.6)),(pnorm(.1) - pnorm(-.1)),(pnorm(.6) - pno
y
```

```
##
##  Chi-squared test for given probabilities
##
## data:  x
## X-squared = 3.4069, df = 4, p-value = 0.4922
```

We got a value of .4922 which is larger than alpha of .05 so we can assume that the values of normally distributed.

9.51)

```r
"Group 1 -"
```

```
## [1] "Group 1 -"
```

```r
500 * pnorm(-.5)
```

```
## [1] 154.2688
```

```r
"Group 2 -"
```

```
## [1] "Group 2 -"
```

```r
500 * (pnorm(-.1) - pnorm(-.5))
```

```
## [1] 75.81731
```

```r
"Group 3 -"
```

```
## [1] "Group 3 -"
```

```r
500 * (pnorm(.1) - pnorm(-.1))
```

```
## [1] 39.82784
```

```r
"Group 4 -"
```

```
## [1] "Group 4 -"
```

```r
500 * (pnorm(.5) - pnorm(.1))
```

```
## [1] 75.81731
```

```r
"Group 5 -"
```

```
## [1] "Group 5 -"
```

```r
500 * pnorm(.5, lower.tail=FALSE)
```

```
## [1] 154.2688
```

```r
"X^2 - "
```

```
## [1] "X^2 - "
```

```r
(((139-137)^2 / 137) + ( (102-93)^2 / 93 ) + ( (41-40)^2 / 40 ) + ( (78-93)^2 / 93 ) ) + ( (140-137)^2 /
```

```
## [1] 3.410213
```

```r
x <- c(168, 83, 35, 78, 136)
y <- chisq.test(x, p = c(pnorm(-.5),(pnorm(-.1) - pnorm(-.5)),(pnorm(.1) - pnorm(-.1)),(pnorm(.5) - pno
y
```

```
##
##  Chi-squared test for given probabilities
##
## data:  x
## X-squared = 4.7141, df = 4, p-value = 0.3179
```

We got a value of .3179 which is larger than alpha of .05 so we can assume that the values of normally distributed.