21BDS0340

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Probability and Statistics Lab

Lab Assessment – IV

Part a

Code:
```
p = 50000
x = 46500
n = 28
sd = 8000
alpha = 0.05
h0 = "The claim is supported at 5% LOS"
h1 = "The claim is not supported at 5% LOS"
test_tail_type = 2

z_alpha = qnorm(1 - alpha * test_tail_type / 2) # two tailed test
z = abs((x - p) / (sd * sqrt(n)))
print(paste("z: ", z))
print(paste("z_alpha: ", z_alpha))
if(z > z_alpha){
 print(h1)
} else {
 print(h0)
}
```

Output:
```
[1] "z:  0.0826797284707684"
[1] "z_alpha:  1.64485362695147"
[1] "The claim is supported at 5% LOS"
```

Part b

Code:
```
P1 = 0.2
n1 = 900
P2 = 0.15
n2 = 1600
alpha = 0.05
h0 = "The difference between the proportions is not significant"
h1 = "The difference between the proportions is significant"
test_tail_type = 2
```

```
p1 = P1 * n1
p2 = P2 * n2
P = (p1 + p2) / (n1 + n2)
Q = 1 - P
z = (P1 - P2) / sqrt((P * Q * (1/n1 + 1/n2)))
z_alpha = qnorm(1 - alpha * test_tail_type / 2) # two tailed test
print(paste("z: ", z))
print(paste("z_alpha: ", z_alpha))
if(z > z_alpha){
 print(h1)
} else {
 print(h0)
}
```

Output:
```
[1] "z:  3.20970369383185"
[1] "z_alpha:  1.64485362695147"
[1] "The difference between the proportions is significant"
```

Part c

Code:
```
p1 = 42
n1 = 200
p2 = 18
n2 = 100
alpha = 0.05
h0 = "8% is a valid claim"
h1 = "8% is not a valid claim"
test_tail_type = 2

P1 = p1 / n1
P2 = p2 / n2
P = (p1 + p2) / (n1 + n2)
Q = 1 - P
z = (P1 - P2) / sqrt((P * Q * (1/n1 + 1/n2)))
z_alpha = qnorm(1 - alpha * test_tail_type / 2) # two tailed test
print(paste("z: ", z))
print(paste("z_alpha: ", z_alpha))
if(z > z_alpha){
 print(h1)
} else {
 print(h0)
}
```

Output:
[1] "z: 0.612372435695794"
[1] "z_alpha: 1.64485362695147"
[1] "8% is a valid claim"