

EX 6 Z-Test

230701332

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```
sample_mean <- 75
population_mean <- 72
sigma <- 10
n <- 100
alpha <- 0.05

z_stat <- (sample_mean - population_mean) / (sigma / sqrt(n))

z_critical <- qnorm(1 - alpha / 2)

z_stat
## [1] 3

z_critical
## [1] 1.959964

if(abs(z_stat) > z_critical) {
  print("Reject the null hypothesis")
} else {
  print("Fail to reject the null hypothesis")
}

## [1] "Reject the null hypothesis"

sample_mean <- 506.3
population_mean <- 500
sigma <- 15
n <- 30
alpha <- 0.01

z_stat <- (sample_mean - population_mean) / (sigma / sqrt(n))

z_critical <- qnorm(1 - alpha)

z_stat
## [1] 2.300435

z_critical
## [1] 2.326348
```

```

if(z_stat > z_critical) {
  print("Reject the null hypothesis")
} else {
  print("Fail to reject the null hypothesis")
}

## [1] "Fail to reject the null hypothesis"

sample_mean <- 493.6
population_mean <- 500
sigma <- 15
n <- 30
alpha <- 0.01

z_stat <- (sample_mean - population_mean) / (sigma / sqrt(n))

z_critical <- qnorm(alpha)

z_stat
## [1] -2.33695

z_critical
## [1] -2.326348

if(z_stat < z_critical) {
  print("Reject the null hypothesis")
} else {
  print("Fail to reject the null hypothesis")
}

## [1] "Reject the null hypothesis"

sample_mean <- 177
population_mean <- 175
sigma <- 10
n <- 200
alpha <- 0.01

z_stat <- (sample_mean - population_mean) / (sigma / sqrt(n))

z_critical <- qnorm(1 - alpha)

z_stat
## [1] 2.828427

z_critical
## [1] 2.326348

```

```

if(z_stat > z_critical) {
  print("Reject the null hypothesis")
} else {
  print("Fail to reject the null hypothesis")
}

## [1] "Reject the null hypothesis"

sample_mean <- 173.4
population_mean <- 175
sigma <- 10
n <- 200
alpha <- 0.01

z_stat <- (sample_mean - population_mean) / (sigma / sqrt(n))

z_critical <- qnorm(alpha)

z_stat
## [1] -2.262742

z_critical
## [1] -2.326348

if(z_stat < z_critical) {
  print("Reject the null hypothesis")
} else {
  print("Fail to reject the null hypothesis")
}

## [1] "Fail to reject the null hypothesis"

```