# R Module 5 Rubric

## Questions

1. Adapt the code above to calculate the area under the curve (probability) for the following intervals of x:
   * (-2, 2)
   * (-3, 3)
   * (-4, 4)

pnorm(2) - pnorm(-2)

## [1] 0.9544997

pnorm(3) - pnorm(-3)

## [1] 0.9973002

pnorm(4) - pnorm(-4)

## [1] 0.9999367

1. Use qnorm() to calculate the values of x for each of the following circumstances. Provide both the calculated values of x and your R code.
2. 20% of the area of the curve is to the left of an unknown value of x
3. 67% of the area of the curve is to the right of an unknown value of x

qnorm(0.2)

## [1] -0.8416212

1 - qnorm(0.67)

## [1] 0.5600868

1. Use the salary data from above to create 90%, 95%, and 99% confidence intervals. Provide each interval, along with your code. What happens to the interval range as you increase the confidence percentage?

x <- c(44617, 7066, 17594, 2726, 1178, 18898, 5033, 37151, 4514, 4000)  
  
confidence <- function(x, sdev = 15000, ci) {  
 n <- length(x)  
 xbar <- mean(x)  
 alpha <- (1 - ci) / 2  
 z.alpha.2 <- qnorm(p = 1 - alpha,  
 mean = 0,  
 sd = 1)  
 lbound <-  
 xbar - (z.alpha.2 \* (sdev / sqrt(n)))  
 ubound <-  
 xbar + (z.alpha.2 \* (sdev / sqrt(n)))  
   
 lbound <- round(lbound, digits = 2)  
 ubound <- round(ubound, digits = 2)  
   
 return(c(lbound, ubound))  
}  
  
for (i in c(0.9, 0.95, 0.99)) {  
 print(confidence(x, ci = i))  
}

## [1] 6475.47 22079.93  
## [1] 4980.77 23574.63  
## [1] 2059.47 26495.93

*As we increase the confidence level, the confidence interval widens, because we need a larger range to be confident that the population mean lies within our range*