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
```

2. Use `qnorm()` to calclulate the values of `x` for each of the following circumstances. Provide both the calculated values of `x` and your R code.

a. 20% of the area of the curve is to the left of an unknown value of x
b. 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
```

3. 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