Module 04 Exercises

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Note: I could not convert plots properly using R Markdown. There will be a word document submitted with code and plot for Exercise 4.2 a, b, c, and d.

Exercise 4.2

a.) Z > -1.13

```
# Code to get answer:
print(1 - pnorm(-1.13, mean = 0, sd = 1))
```

```
## [1] 0.8707619
```

Answer: 87.1%

b.) Z < 0.18

```
# Code to get answer:
print(pnorm(0.18, mean = 0, sd = 1))
```

```
## [1] 0.5714237
```

Answer: 57.1%

c.) Z > 8

```
# Code to get answer:
print(1 - pnorm(8, mean = 0, sd = 1))
```

```
## [1] 6.661338e-16
```

Answer: approximately 0%

d.) |Z| < 0.5

```
# Code to get answer:
1 - (1 - pnorm(0.5)) - pnorm(-0.5)
```

```
## [1] 0.3829249
```

Answer is 38.3%

Exercise 4.4

a.) Men, Ages 30-34 N($\mu = 4313$, $\sigma = 583$)

Women, Ages 25-29 N($\mu = 5261$, $\sigma = 807$)

b.)

```
# Leo's Z-score
leo_z = (4948 - 4313) / 583
print(leo_z)
```

```
## [1] 1.089194
```

```
# Mary's Z-score
mary_z = (5513 - 5261) / 807
print(mary_z)
```

```
## [1] 0.3122677
```

Leo is 1.09 standard deviations from mean time of 4313 in his group. Mary is 0.3123 standard deviations from mean time of 5261 in her group.

c.)

```
# Leo:
print(pnorm(1.09))
```

```
## [1] 0.8621434
```

Leo finished slower than over 86% of finishers in his group.

```
# Mary:
print(pnorm(0.3123))
```

```
## [1] 0.6225937
```

Mary finished slower than over 62% of finishers in her group.

Mary ranked better in her respective group compared to Leo, as she was less slower in her group compared to Leo.

d.)

```
print(1 - pnorm(1.09))
```

```
## [1] 0.1378566
```

Leo finished faster than over 13% of finishers.

e.)

```r
print(1 - pnorm(0.3123))
```

```
## [1] 0.3774063
```

Mary finished faster than over 37% of finishers.

f.) If the distribution was not normal, our answers from part b to part e would absolutely change. All of the calculations that were doing were under the requirements of the distribution being normal.

Exercise 4.8

a.) Z-score < 0:

```r
zero_z = pnorm(0, mean = 14.7, sd = 33)
print(zero_z)
```

```
## [1] 0.3279957
```

This portfolio loses money approximately 32.8% of years

b.) Cutoff for highest 15% of annual returns. 100% - 15% = 85th percentile

```r
percentage = qnorm(0.85, mean = 14.7, sd = 33)
print(percentage)
```

```
## [1] 48.9023
```

The cutoff for highest 15% of annual returns is 48.9%.