Max Greene HW10

6.2.1

In problem 6.2.1 in the textbook, use the given information to compute the $(1-\alpha)100\%$ confidence interval. ##a $H_0 : \mu = 120$ versus $H_1 : \mu < 120; \bar{y} = 114.2, n = 25, \sigma = 18, \alpha = 0.08$

```
mu <- 120
y_bar <- 114.2
n <- 25
sigma <- 18
alpha <- 0.08
(z <- (y_bar-mu)/(sigma/sqrt(n)))
```

```
## [1] -1.611111
```

```
(z_alpha_norm <- qnorm(0.08))
```

```
## [1] -1.405072
```

```
(z_alpha_test <- qnorm(0.08))*(sigma/sqrt(n))+mu
```

```
## [1] 114.9417
```

b

$H_0 : \mu = 42.9$ versus $H_1 : \mu \neq 42.9; \bar{y} = 45.1, n = 16, \sigma = 3.2, \alpha = 0.01$

```
mu <- 42.9
y_bar <- 45.1
n <- 16
sigma <- 3.2
alpha <- 0.01
(z <- (y_bar-mu)/(sigma/sqrt(n)))
```

```
## [1] 2.75
```

```
(z_alpha_norm <- qnorm(c(alpha/2,1-alpha/2)))
```

```
## [1] -2.575829  2.575829
```

```
(z_alpha_test <- qnorm(c(alpha/2,1-alpha/2)))*(sigma/sqrt(n))+mu
```

```
## [1] 40.83934 44.96066
```

c

$H_0 : \mu = 14.2$ versus $H_1 : \mu > 14.2; \bar{y} = 15.8, n = 9, \sigma = 4.1, \alpha = 0.13$

```
mu <- 14.2
y_bar <- 15.8
n <- 9
sigma <- 4.1
alpha <- 0.13
(z <- (y_bar-mu)/(sigma/sqrt(n)))
```

```
## [1] 1.170732
```

```r
(z_alpha_norm <- qnorm(1-alpha))
```

```
## [1] 1.126391
```

```r
(z_alpha_test <- qnorm(1-alpha))*(sigma/sqrt(n))+mu
```

```
## [1] 15.7394
```

6.2.2

Random sample, 22 diagnosed.

Past ADD score $\mu_{ADD} = 95, \sigma_{ADD} = 15$.

Use $\alpha = 0.06$. For what values of $\bar{y}$ should H_0 be rejected if H_1 is two-sided?

```r
mu <- 95
sigma <- 15
n <- 22
alpha <- 0.06
(z_alpha_norm <- qnorm(c(alpha/2,1-alpha/2)))
```

```
## [1] -1.880794  1.880794
```

```r
(z_alpha_test <- qnorm(c(alpha/2,1-alpha/2)))*(sigma/sqrt(n))+mu
```

```
## [1]  88.9852 101.0148
```

6.2.3

6.2.4

Population mean 32,500. 15 sample drivers 33,800 on new tires. Assume $\sigma = 4000$ for both cases. Can the company claim a statisticaly significant difference at $\alpha = 0.05$?

```r
mu <- 32500
sigma <- 4000
n <- 15
alpha <- 0.05
(z_alpha_norm <- qnorm(1-alpha))
```

```
## [1] 1.644854
```

```r
mu
```

```
## [1] 32500
```

```r
(z_alpha_test <- qnorm(1-alpha))*(sigma/sqrt(n))+mu
```

```
## [1] 34198.8
```

6.2.9

6.2.10

Average blood pressure $\mu = 120, \sigma = 12$. Sample of $n = 50$ women, $\mu = 125.2$.

$H_0 : \mu_{exam} \neq \mu_{norm}$, $H_1 : \mu_{exam} = \mu_{norm}$

```r
mu <- 120
sigma <- 12
n <- 50
alpha <- 0.05
(z_alpha_norm <- qnorm(1-alpha))
```

```
## [1] 1.644854
```

```r
(z_alpha_test <- qnorm(1-alpha))*(sigma/sqrt(n))+mu
```

```
## [1] 122.7914
```

```r
alpha <- 0.01
(z_alpha_norm <- qnorm(1-alpha))
```

```
## [1] 2.326348
```

```r
(z_alpha_test <- qnorm(1-alpha))*(sigma/sqrt(n))+mu
```

```
## [1] 123.9479
```

This data shows a significant increase in heartrate with 99% confidence.

6.3.1

6.3.2

6.3.4

6.3.7

6.3.9

6.4.2

6.4.3

6.4.6

6.4.8

6.4.12

6.4.13

6.4.14