Q1

Param of interest: heart rate after 15 min of bowling
Null Hypothesis: $\mu = 98bpm$
Alt Hypothesis: $\mu \neq 98bpm$
Signifcance: $\alpha = 0.01$
Type of test: Parted t-test

$$\begin{aligned} t &= \frac{\overline{x} - \mu}{s/\sqrt{n}} \\ &= \frac{101 - 98}{15/\sqrt{14}} \\ &= .05 \end{aligned}$$

df = 13
sig level = .01
From t-table $\rightarrow 3.012 > |.05|$
So pass

Param of interest: heart rate after 15 min of bowling
Null Hypothesis: $\mu = 66bpm$
Alt Hypothesis: $\mu > 66bpm$
Signifcance: $\alpha = 0.01$
Type of test: one-sample t-test

$$\begin{aligned} t &= \frac{\overline{x} - \mu}{s/\sqrt{n}} \\ &= \frac{101 - 66}{15/\sqrt{14}} \\ &= 8.73 \end{aligned}$$

df = 13
sig level = .01
From t-table $\rightarrow 2.65 < |8.73|$
So fail

Q2

$$
\begin{aligned}
W &= 145.349 - 134.651 \\
&= 10.698 \\
W &= 2Z\frac{s}{\sqrt{n}} \\
10.698 &= 2Z\frac{25}{\sqrt{66}} \\
Z &= 10.698(1/2)(\sqrt{66})(1/25) \\
Z &= 1.74
\end{aligned}
$$

From z table, 95% confidence
They are 95% sure the actual value falls within the interval
Significance level to use = 100% - 95% - 5%
144 is within the interval, so null hypothesis would pass

Q3

Null Hypothesis: $\mu_{generic} = \mu_{brand} = 1.5hrs$
Alt Hypothesis: $\mu_{generic} \neq \mu_{brand}$
Not sure how to calc type 2 errors :P

```
alpha <- 0.03
sigma <- 0.25
mu_generic <- 1.4
n <- 36

# Find the critical z-values
z_alpha <- qnorm(1 - alpha / 2)

# Calculate the z-score for mu_generic
z <- (mu_generic - 1.5) / (sigma / sqrt(n))

# Calculate the power
power <- pnorm(z, lower.tail = FALSE) + pnorm(-z, lower.tail = TRUE)

print(power)
```

Honestly not sure what it's asking me to do lol...

Q4