Project 3
STAT 355

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1 Part 1

1.1 Question

An oceanographer wants to test, on the basis of a random sample of size 35, whether the average depth of the ocean in a certain area is 72.4 fathoms. At the 0.05 level of significance, what will the oceanographer decide if she gets a sample mean of 73.2? Assume the population standard deviation is 2.1.

1.2 Answer

The null hypothesis, H_0, claims the mean depth of the ocean in a certain area is 72.4, while the alternative hypothesis, H_a, says otherwise.

$$H_0 : \mu = 72.4 \ vs \ H_a : \mu \neq 73.2$$

Calculating the Z-score:

$$Z = \frac{X - \mu}{\frac{\sigma}{\sqrt{n}}} = \frac{73.2 - 72.4}{\frac{2.1}{\sqrt{35}}}$$

The following snippet was used to generate the Z-value and its probability:

```
X <- 73.2
mu <- 72.4
sigma <- 2.1
n <- 35

z <- (X - mu)/(sigma/sqrt(n))
print(z) # print the Z-score
print(pnorm(z)) # print the probability
```

The Z-score was computed to be:

$$Z = 2.2537, \ P(Z) = 0.9879$$