NDH802 - Hypothesis testing

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9.55

A random sample of 10 students contains the following observations, in hours, for time spent studying in the week before final exams:

28 57 42 35 61 39 55 46 49 38

Assume that the population distribution is normal.

a. Find the sample mean and standard deviation.

```
sample = c(28,57,42,35,61,39,55,46,49,38)
mu_0 = mean(sample)
sd = sd(sample)
```

b. Test, at the 5% significance level, the null hypothesis that the population mean is 40 hours against the alternative that it is higher.

R shortcuts:

$H_o : \mu = 40, H_1 : \mu > 40$

```
ttest = t.test(sample, mu = 40, alternative = "greater")
ttest$p.value
```

```
## [1] 0.08392533
```

Because the p-value is higher than 0.05, we fail to reject the null hypothesis.

By hand:

```
n = 10
mu = 40

t = (mu_0 - mu)/(sd/sqrt(n)) #just plug in the numbers
t_score = qt(p = 0.95, df = n-1) #use the t-table as you prefer
```

Because `t_score` is higher than `t`, we fail to reject the null hypothesis.