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"I pledge my honor that I have abided by the Steven's honor code".

```
#-------------------------------------
# Hw 6.58: Computing the P-Value
#-------------------------------------
z <- 1.77

#a
1 - pnorm(z)

#b
pnorm(z)

#c
(1 - pnorm(z)) * 2
```

```
> #a
> 1 - pnorm(z)
[1] 0.03836357
>
> #b
> pnorm(z)
[1] 0.9616364
>
> #c
> (1 - pnorm(z)) * 2
[1] 0.07672714
```

```
#-------------------------------------
# Hw 6.59: Computing the P-Value pt.2
#-------------------------------------
z<- -1.69

#a
1 - pnorm(z)

#b
pnorm(z)

#c
(pnorm(z)) * 2
```

```
> #a
> 1 - pnorm(z)
[1] 0.954486
>
> #b
> pnorm(z)
[1] 0.04551398
>
> #c
> (pnorm(z)) * 2
[1] 0.09102795
>
```

```r
#-----------------------------------------
# HW 6.71: Attitudes toward school
#-----------------------------------------

sample_mean <- 127.8
mean <- 115
SD <- 30
n <- 25

#a
z <- (sample_mean - mean) / (SD / sqrt(25))
1 - pnorm(z)

#Since pt = 0.97833 >> 1 - (a = 0.05) we reject the null hypothesis,
#i.e, there is significant evidence to show the mean SSHA score for students
#over 30 are greater than 115.

#b
# Assumption 1 --> Sample is random
# Assumption 2 --> Sample is apx. normal
#
# Assumption 1 is the most important for my conclusions b/c even if the sample's
# distribution isn't apx. norm, we've taken enough samples to approximate the
# distribution as norm by the Law of the Large numbers. We can't do that if
# the sample is not random however.
```

```
> sample_mean <- 127.8
> mean <- 115
> SD <- 30
> n <- 25
>
> #a
> z <- (sample_mean - mean) / (SD / sqrt(25))
> 1 - pnorm(z)
[1] 0.0164487
>
```

```r
#----------------------------------------
# HW 6.73: Are the measurements similar?
#----------------------------------------

# I'm pretty sure that SD should be 3.0 not 30 --> check back solutions

sample <- c(5, 6.5, -0.6, 1.7, 3.7, 4.5, 8.0, 2.2, 4.9, 3.0, 4.4,
            0.1, 3.0, 1.1, 1.1, 5.0, 2.1, 3.7, -0.6, -4.2)

mean <- mean(sample)
n <- 20
SD <- 3.0

#a
# H0: μ = 0 mpg || Ha: μ != 0 mpg

#b
t <- (mean - 0) / (SD / (sqrt(20)))
t
pt(t, n - 1)

# Since P = 0.9996 > 1 - a = 0.05, we reject the null hypothesis. That is
# we do have significant evidence to show a difference in computer & human
# calculations for mpg.
```

```
> mean <- mean(sample)
> n <- 20
> SD <- 3.0
>
> #a
> # H0: μ = 0 mpg || Ha: μ != 0 mpg
>
> #b
> t <- (mean - 0) / (SD / (sqrt(20)))
> t
[1] 4.069644
> pt(t, n - 1)
[1] 0.9996732
```

```r
#-------------------------------------------------
# HW 6.99: Practical significance and sample size
#-------------------------------------------------

sample_mean <- 2453.7
SD <- 880

#a
t <- abs(sample_mean - 2403.7) / (SD / sqrt(100))
1 - pnorm(t)


#b
t <- abs(sample_mean - 2403.7) / (SD / sqrt(500))
1 - pnorm(t)

#c
t <- abs(sample_mean - 2403.7) / (SD / sqrt(2500))
1 - pnorm(t)
```

```
> #a
> t <- abs(sample_mean - 2403.7) / (SD / sqrt(100))
> 1 - pnorm(t)
[1] 0.2849558
>
>
> #b
> t <- abs(sample_mean - 2403.7) / (SD / sqrt(500))
> 1 - pnorm(t)
[1] 0.1019545
>
> #c
> t <- abs(sample_mean - 2403.7) / (SD / sqrt(2500))
> 1 - pnorm(t)
[1] 0.002249257
```

```r
#-------------------------------------------------
# HW 6.120: Choose the appropriate distribution
#-------------------------------------------------

#a
# Reject if for p0, p0(x <= 2)
# P(X <= 2) : P(p0(0) + p0(1) + p0(2)) = 0.1 + 0.1 + 0.2 = 0.4



#b
# Reject if for p1, p1(x <= 2)
# P(X <= 2) : P(p1(0) + p1(1) + p1(2)) = 0.2 + 0.2 + 0.2 = 0.6
```

```r
#-----------------------------------------------------
# HW 7.22: A one-sample t test
#-----------------------------------------------------

n <- 16
t <- 2.15

#a
df <- n - 1
df

#b
# (2.131, 2.249)

#c
# 0.025 and 0.01

#d
# t* for a = 2.5% is 2.131 < 2.15 --> At 2.5% significance level
# t* for a = 1% is 2.249 > 2.15 --> Not at 1% significance level

#e
1 - pt(t, df)
```

```
> n <- 16
> t <- 2.15
>
> #a
> df <- n - 1
> df
[1] 15
>
> #b
> # (2.131, 2.249)
>
> #c
> # 0.025 and 0.01
>
> #d
> # t* for a = 2.5% is 2.131 < 2.15 --> At 2.5% significance level
> # t* for a = 1% is 2.249 > 2.15 --> Not at 1% significance level
>
> #e
> 1 - pt(t, df)
[1] 0.02413742
```

```r
#-----------------------------------------------
# HW 7.23: Another one-sample t test
#-----------------------------------------------

n <- 27
t <- 2.01

#a
df <- n - 1
df

#b
# (1.706, 2.056)

#c
# 0.05 and 0.10

#d
# t* for a = 10% is 1.706 < 2.01 --> At 10% significance level
# t* for a = 5% is 2.056 > 2.01 --> Not at 5% significance level

#e
(1 - pt(t, df)) * 2
```

```
> n <- 27
> t <- 2.01
>
> #a
> df <- n - 1
> df
[1] 26
>
> #b
> # (1.706, 2.056)
>
> #c
> # 0.05 and 0.10
>
> #d
> # t* for a = 10% is 1.706 < 2.01 --> At 10% significance level
> # t* for a = 5% is 2.056 > 2.01 --> Not at 5% significance level
>
> #e
> (1 - pt(t, df)) * 2
[1] 0.05491354
>
```