ROutput_2018-01-24

One-sample t-test

```
# Get data
library(Sleuth3)
poetry.dat = case0101
summary(poetry.dat)
```

```
##      Score           Treatment
##  Min.   : 5.00   Extrinsic:23
##  1st Qu.:14.90   Intrinsic:24
##  Median :18.70
##  Mean   :17.86
##  3rd Qu.:21.25
##  Max.   :29.70
```

```
# Do 1-sample t-test
intrinsic = poetry.dat$Score[poetry.dat$Treatment=="Intrinsic"]
intrinsic
```

```
##  [1] 12.0 12.0 12.9 13.6 16.6 17.2 17.5 18.2 19.1 19.3 19.8 20.3 20.5 20.6
## [15] 21.3 21.6 22.1 22.2 22.6 23.1 24.0 24.3 26.7 29.7
```

```
t.test(intrinsic,mu=20,alternative="greater")
```

```
##
##  One Sample t-test
##
## data:  intrinsic
## t = -0.12874, df = 23, p-value = 0.5507
## alternative hypothesis: true mean is greater than 20
## 95 percent confidence interval:
##  18.3302     Inf
## sample estimates:
## mean of x
##  19.88333
```

```
# Do t-test test-stat by hand
mean(intrinsic)
```

```
## [1] 19.88333
```

```
sd(intrinsic)
```

```
## [1] 4.439513
```

```
(mean(intrinsic) - 20)/(sd(intrinsic)/sqrt(24))
```

```
## [1] -0.1287411
```

```
# p-value by hand
1-pt(-0.1287411,23)
```

```
## [1] 0.5506592
```

z confidence intervals

```r
# 90% CI
mean(intrinsic) + c(-1,1)*qnorm(.95)*sd(intrinsic)/sqrt(24)
```

```
## [1] 18.39275 21.37392
```

```r
# 95% CI
mean(intrinsic) + c(-1,1)*qnorm(.975)*sd(intrinsic)/sqrt(24)
```

```
## [1] 18.10719 21.65948
```

```r
# 99% CI
mean(intrinsic) + c(-1,1)*qnorm(.995)*sd(intrinsic)/sqrt(24)
```

```
## [1] 17.54909 22.21758
```

```r
# Multiplier for 90% CI
qnorm(.95)
```

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

```r
# Multiplier for 95% CI
qnorm(.975)
```

```
## [1] 1.959964
```

```r
# Multiplier for 99% CI
qnorm(.995)
```

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

```r
# Example #1 in Chapter 2 notes, 90% CI
0.5 + c(-1,1)*qnorm(.95)*.4/sqrt(77)
```

```
## [1] 0.4250206 0.5749794
```