Lab 13 R Script

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```
library(BSDA)
```

```
## Loading required package: lattice
```

```
##
## Attaching package: 'BSDA'
```

```
## The following object is masked from 'package:datasets':
##
##     Orange
```

```
library(pwr)
```

1) Shrinkage Percentage of Plastic Clay

```
nsize(b=0.2, sigma=1.2, conf.level=0.98, type="mu")
```

```
##
## The required sample size (n) to estimate the population
## mean with a 0.98 confidence interval so that the margin
## of error is no more than 0.2 is 195 .
```

2) New Product

```
nsize(b=9/40, conf.level=0.90, type="pi")
```

```
##
## The required sample size (n) to estimate the population
## proportion of successes with a 0.9 confidence interval
## so that the margin of error is no more than 0.225 is 14 .
```

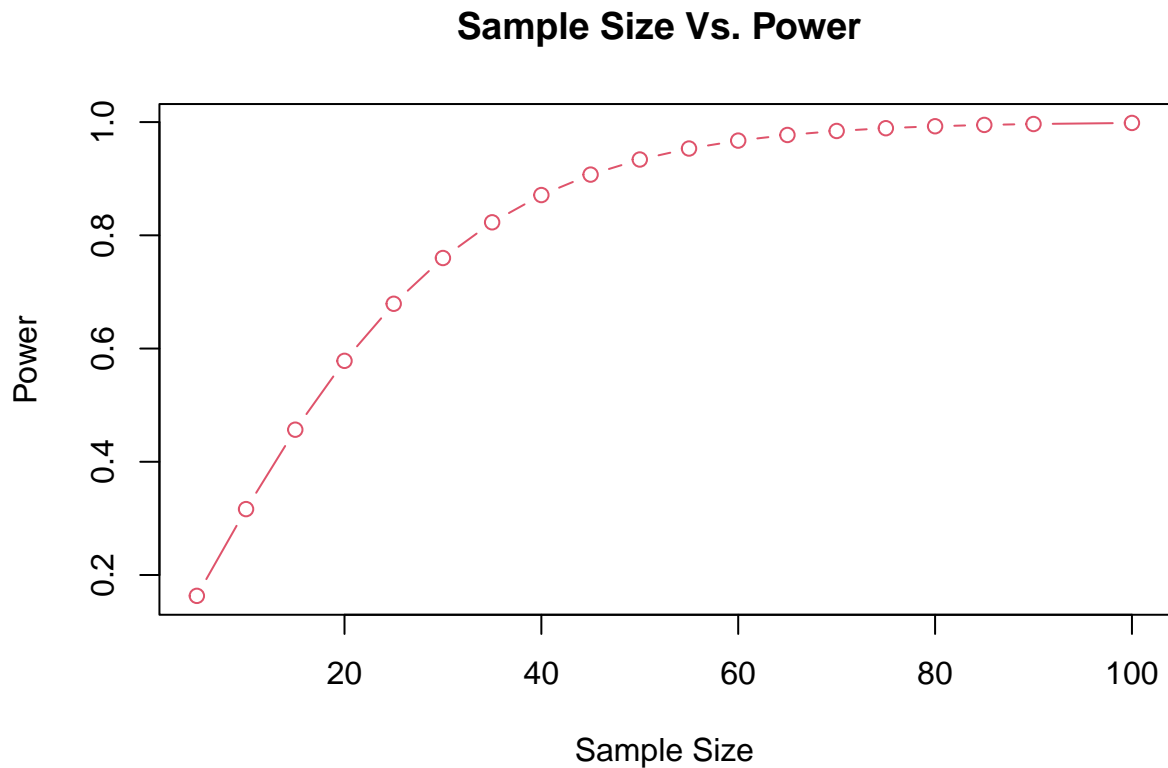3) Sample Size based on Power of Two-sided t-test

```
sample1 = c(5,10,15,20,25,30,35,40,45,50,55,60,65,70,75,80,85,90,100)
power = cbind(NULL, NULL)
for (i in sample1) {
  p1 = power.t.test(d=0.7, n=i, sig.level=0.05,
              alt="two.sided", type="two.sample")
  power = rbind(power, cbind(p1$n, p1$power))
}

power
```

```
##      [,1]      [,2]
## [1,]    5 0.1631800
## [2,]   10 0.3163866
## [3,]   15 0.4566869
```

```
##  [4,]    20 0.5782714
##  [5,]    25 0.6790886
##  [6,]    30 0.7599031
##  [7,]    35 0.8229728
##  [8,]    40 0.8711328
##  [9,]    45 0.9072448
## [10,]    50 0.9339067
## [11,]    55 0.9533297
## [12,]    60 0.9673141
## [13,]    65 0.9772788
## [14,]    70 0.9843134
## [15,]    75 0.9892382
## [16,]    80 0.9926597
## [17,]    85 0.9950205
## [18,]    90 0.9966389
## [19,]   100 0.9984898
```

```r
plot(power, xlab="Sample Size", ylab="Power", main="Sample Size Vs. Power ",type="b",col=2)
```

Sample Size Vs. Power

4) Sample Size based on Effect Size of Two-sided t-test

```r
sample2 = c(0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9, 1.0, 1.1, 1.2, 1.3, 1.4, 1.5)
effect = cbind(NULL, NULL)
for (i in sample2) {
  p2 = power.t.test(d=i, power=0.8, sig.level=0.05,
                alt="two.sided", type="two.sample")
  effect = rbind(effect, cbind(p2$d, p2$n))
```

```
}
```

```
effect
```

```
##         [,1]        [,2]
##  [1,]   0.1 1570.73689
##  [2,]   0.2  393.40666
##  [3,]   0.3  175.38510
##  [4,]   0.4   99.08057
##  [5,]   0.5   63.76576
##  [6,]   0.6   44.58590
##  [7,]   0.7   33.02467
##  [8,]   0.8   25.52463
##  [9,]   0.9   20.38638
## [10,]   1.0   16.71477
## [11,]   1.1   14.00193
## [12,]   1.2   11.94228
## [13,]   1.3   10.34305
## [14,]   1.4    9.07768
## [15,]   1.5    8.06031
```

```
plot(effect, xlab="Effect Size", ylab="Sample Size", main="Effect Size Vs. Sample Size ",type="b",col=2)
```


Effect Size Vs. Sample Size