

Stat141 10/19

Inference for a single mean (including paired data and proportions) SW text Ch.6,9.

```
> #paired data SW Ch.9 is single mean inference, mean of differences
```

```
> virus = read.table(file="D:\\stat141\\virus.dat", header = T)
```

```
> #mengovirus SW ex 9.10 p360 (example of blocking)
```

```
> virus #data tab 9.6 p.360
```

	Nonmutant	Mutant		Nonmutant	Mutant
1	160	97	10	43	7
2	36	55	11	61	15
3	82	31	12	14	10
4	100	95	13	140	150
5	140	80	14	68	44
6	73	110	15	110	31
7	110	100	16	37	14
8	180	100	17	95	57
9	62	6	18	64	70
			19	58	45

```
> attach(virus)
```

```
> diff = Nonmutant - Mutant
```

```
> quantile(diff)
```

	0%	25%	50%	75%	100%
	-37.0	4.5	24.0	53.5	80.0

```
> stem(diff)
```

```
The decimal point is 2 digit(s)
```

```
to the right of the |
```

```
-0 | 4211  
0 | 01112244  
0 | 5566688
```

```
> help("stem")
```

```
> # change scale of stem-and leaf
```

```
> stem(diff, s=2)
```

```
The decimal point is 1 digit(s) to the right of the |
```

```
-2 | 7  
-0 | 906  
0 | 4503  
2 | 3468  
4 | 616  
6 | 039  
8 | 0
```

```
> hist(diff) # somewhat square
```

```
> qqnorm(diff) #looks pretty decent from small sample
```

```
> t.test(diff)
```

```
One Sample t-test
```

```
data: diff
```

```
t = 3.5451, df = 18, p-value = 0.002313
```

```
alternative hypothesis: true mean
```

```
is not equal to 0
```

```
95 percent confidence interval:
```

```
11.06344 43.25235
```

```
sample estimates:
```

```
mean of x
```

```
27.15789
```

```
> t.test(diff, alt = "greater")
```

```
One Sample t-test
```

```
data: diff
```

```
t = 3.5451, df = 18, p-value = 0.001156
```

```
alternative hypothesis: true mean
```

```
is greater than 0
```

```
95 percent confidence interval:
```

```
13.87382 Inf
```

```
sample estimates:
```

```
mean of x
```

```
27.15789
```

```
> qt(.975,18);qt(.95,18) #critical values alpha = .05, .10 2-sided
```

```
[1] 2.100922
```

```
[1] 1.734064 # critical values alpha = .05, 1-sided
```

```
> 1- pt(3.5451, 18) #p-value, prob data at least this extreme given Ho
```

```
[1] 0.001156496
```

```
> 2*(1- pt(3.5451, 18)) #p-value, prob data |t| at least this extreme given Ho
```

```
[1] 0.002312993
```

```
> #design note--value of blocking, keeping track of the run (day)
```

```
> sd(diff);sqrt(var(Nonmutant) + var( Mutant))
```

```
[1] 33.39205
```

```
[1] 61.4248
```

```
> #blocking worth about a factor of 4 here in number of runs; would need over 70 if no blo
```

Normal Q-Q Plot

