Chapter 4

8. A confidence interval is a range of values around a measured mean that has some likelihood of containing the true mean value.

(11.) mean = 0.14_8

standard deviation = 0.03_4

90% $\mu = 0.14_8 \pm \frac{(2.015)(0.034)}{\sqrt{6}}$

$= 0.15 \pm 0.03\%$ at the 90% confidence limit

99% $\mu = 0.14_8 \pm \frac{(4.032)(0.034)}{\sqrt{6}}$

$= 0.15 \pm 0.6\%$ at the 99% confidence limit

(13) a. dL = deciliter = 0.1L

b. compare stdevs: $F_{calc} = \frac{0.53}{0.42} = 1.26$

$F_{calc} < F_{table}$ ∴ pool stdevs

F_{table} at 95% = 6.26

$s_{pooled} = \sqrt{\frac{0.53^2(5) + 0.42^2(4)}{6+5-2}}$

$= 0.484$

$t = \frac{|14.57 - 13.95|}{0.484}\sqrt{\frac{6 \cdot 5}{6+5}} = 2.13$

$t_{table} = 2.262 > 2.13$

∴ the results agree

$\bar{X} = 97.00 \quad n = 5$

(21)

$s = 1.66$

$\mu = 97.0_0 \pm \frac{(2.776)(1.66)}{\sqrt{5}}$

97 ± 2 ppm at 95% confidence interval

This range does not include 94.6ppm, so the results are statistically different

Add additional measurement:

$\bar{X} = 96.58 \quad n = 6$

$s = 1.80$

$\mu = 96.5_8 \pm \frac{(2.571)(1.80)}{\sqrt{6}}$

97 ± 2 ppm

result does not change

(23)

$\text{span} = 216 - 204 = 12$

$\text{range} = 216 - 192 = 24$

$\frac{12}{24} = 0.5 = Q$

$Q_{table} = 0.64 > 0.5 \therefore$ keep the result