#4

6.1)

50 measurements of Q

$\overline{Q} = 4.8$, $\delta Q = 0.4$

a) $1 - 0.955 = 0.045 \rightarrow 4.5\%$

expected # $\rightarrow$ 2.3

NOT Rejected.

b) $\frac{6.0 - 4.8}{0.4} = 3$; rejected

6.6)

# of measurments	Boundary of rejection (σ)
5	1.6
10	2.0
15	2.1
20	2.2
50	2.5
100	2.8
200	3.0
1000	4.0

7.2)

a)

$u_1 = 334 \pm 1 \qquad \omega_1 = 1$

$u_2 = 336 \pm 2 \qquad \omega_2 = \frac{1}{4}$

$$\begin{cases} u_{WAV} = \dfrac{\omega_1 x_1 + \omega_2 x_2}{\omega_1 + \omega_2} = 334.4 \\ \sigma_{WAV} = \dfrac{1}{\sqrt{1 + 1/4}} = 0.89 \end{cases}$$

$\longrightarrow \quad 334.4 \pm 0.9 \quad \frac{m}{s}$

b) $u_1 = 334 \pm 1 \; ; \; \omega_1 = 1$

$u_2 = 336 \pm 5 \; ; \; \omega_2 = 1/25$

$$\begin{cases} u_{WAV} = \dfrac{334 + \frac{1}{25} \cdot 336}{1 + 1/25} = 334.08 \\ \sigma_{WAV} = \dfrac{1}{\sqrt{1 + 1/25}} = 0.98 \end{cases}$$

$\longrightarrow \quad 334 \pm 1$

7.7)

- $\sigma_{WAV} = \dfrac{1}{\sqrt{N \omega_i}}, \quad \omega_i = \dfrac{1}{\sigma_i^2}$
- $x_{WAV} = \dfrac{\Sigma \omega_i x_i}{\Sigma \omega_i} = \dfrac{\Sigma \omega \cdot x_i}{N \omega} = \dfrac{\Sigma x_i}{N}$
- $\sigma_{WAV} = \dfrac{1}{\sqrt{N \omega_i}} = \dfrac{1}{\sqrt{N \frac{1}{\sigma_i^2}}} = \dfrac{\sigma_i}{\sqrt{N}}$