

Homework 7 E232 Mary Matheson

I pledge my honor that I have abided
by the Stevens Honor System
Mary Matheson

7.5) Max possible error
Estimate of uncertainty

$$x = 12.5 \pm 1.25 \text{ cm} = 12.5 \pm 10\%$$

$$k = 700 \pm 18 \text{ N/cm} = 700 \pm 2.57\%$$

$$F = kx \quad F = 700 \cdot 12.5 = 8750 \pm 35.7\%$$

$$\% \text{ uncert} = 0.257 + 0.1$$

Max possible err = 3123.75 N
Uncertainty: 35.7%

$$7.20) \text{ avg} = \frac{\text{total}}{\#} = \frac{2483}{10} = 248.3$$

$$\text{st dev} = \sqrt{\frac{\sum_{i=1}^{10} (i - 248.3)^2}{9}} = 0.5477$$

$$P_{\bar{x} \text{ final}} = \pm t_{0.025} \left(\frac{s_x}{\sqrt{n}} \right) = \pm 2.262 \cdot \frac{0.5477}{\sqrt{10}}$$
$$= \pm 0.392$$

$$P_{\text{single val}} = \pm 2.262 \cdot 0.5477 = \pm 1.24$$

7.21

$$a) \text{ mean} = \frac{\text{sum}}{\#} = 1.444$$

$$b) S = 0.016465$$

$$S_{\text{of mean}} = \frac{0.016465}{\sqrt{10}} = 0.00521$$

$$c) P = \pm t_{9, 0.025} \cdot S_{\text{mean}}$$

$$= \pm 2.262 \cdot 0.016465$$

$$= \pm 0.0372$$

$$d) P = \pm t_{9, 0.025} \cdot S_{\text{of mean}}$$

$$= \pm 2.262 \cdot 0.00521$$

$$= \pm 0.0118$$