

VI-3:

m(g)	$m_t$	H(cm)	y(cm)	$\theta$	$\mu_s$
200	304.5	29.5	12.5	12.5	0.22
400	504.5	28.6	11.6	11.5	0.2
600	704.5	28.2	11.2	10.9	0.19
800	904.5	28	11	10.9	0.19
1000	1104.5	27.6	10.6	10.3	0.18

$y = h - d$   
 $y = 29.5 - 17.0$   
 $y = 12.5$

$\sin \theta_c = \frac{y}{L}$   
 $\sin \theta_c = \frac{12.5}{57.3}$   
 $\sin \theta_c = 0.218$   
 $\theta_c = \sin^{-1}(0.218)$   
 $\theta_c = 12.5^\circ$

$M_t = \text{Total mass}$   
 $M_t = \text{mass of pan} + m$   
 $M_t = 104.5 + 200$   
 $M_t = 304.5 \text{ g}$

$\mu_s = \tan \theta_c$   
 $\mu_s = \tan(12.5)$   
 $\mu_s = 0.22$

$$\sigma_{\bar{\mu}_s} = \frac{\sqrt{\sum (\mu_s - \bar{\mu}_s)^2}}{n-1}$$

$$\sigma_{\bar{\mu}_s} = \frac{\sqrt{(0.22-0.19)^2 + (0.2-0.19)^2 + (0.19-0.19)^2 + (0.19-0.19)^2 + (0.18-0.19)^2}}{4}$$

$$\sigma_{\bar{\mu}_s} = 0.016$$

VI-4:

m(g)	$m_t$	H	y	$\theta$	$\mu_s$
100	228.5	46	29	30.3	0.58
200	328.5	45.6	28.6	29.3	0.56
300	428.5	43.8	26.8	27.3	0.51
400	528.5	40.8	23.8	24.2	0.44
500	628.5	44.7	27.7	28.6	0.54

$m_t = \text{total mass}$        $y = H - d$        $\sin \theta_c = \frac{y}{L}$   
 $m_t = \text{mass of pan} + M$        $y = 46 - 17$        $\sin \theta_c = \frac{29}{57.3}$   
 $m_t = 128.5 + 100$        $y = 29$        $\theta_c = \sin^{-1}(.506)$   
 $m_t = 228.5$        $\theta_c = 30.3$

$\mu_s = \tan \theta_c$        $\bar{\mu}_s = \frac{\mu_{s1} + \mu_{s2} + \mu_{s3} + \mu_{s4} + \mu_{s5}}{5}$   
 $\mu_s = \tan(30.3)$        $\bar{\mu}_s = \frac{.58 + .56 + .51 + .44 + .54}{5}$   
 $\mu_s = .58$        $\bar{\mu}_s = .52$

$$\sigma_{\mu_s} = \sqrt{\frac{\sum (\mu_{si} - \bar{\mu}_s)^2}{n-1}}$$

$$\sigma_{\mu_s} = \sqrt{\frac{(.58 - .52)^2 + (.56 - .52)^2 + (.51 - .52)^2 + (.44 - .52)^2 + (.54 - .52)^2}{4}}$$

$$\sigma_{\mu_s} = .027$$

$$\bar{\mu}_s \pm \sigma_{\mu_s}$$

$$.52 \pm .027$$