Name:_____

You may use Excel. You may not use your calculator. This worksheet is due at the end of class.

Prob 1: In 1 Kings 7:23 we read: *…the metal basin was circular, measuring ten cubits from brim to brim, and thirty cubits in circumference…*

→ Determine π and $\Delta\pi$ from this data, knowing that *only* integer values of cubits are ever recorded. Note: a "cubit" is the distance from the elbow to the fingertips, and naturally varied a bit from worker to worker. How does this variation affect the result for pi?

Prob 2: A solid cylinder has $R = (0.286 \pm 0.002)$ m and $H = (0.82 \pm 0.01)$ m, determine $V \pm \Delta V$.

Prob 3: Given: $T = (1 - S)\rho g h^3$ (i.e., the tension in a string holding a wooden cube having sides h and specific gravity S submerged in a fluid of density ρ). Assume g is known exactly. Symbolically determine ΔT.

Prob 4: Given $V_0 = \sqrt{V_{0x}^2 + V_{0y}^2}$ (i.e., the initial speed of a projectile), determine ΔV_0.

Prob 5: Given $\theta_0 = \tan^{-1}\left(\frac{V_{0y}}{V_{0x}}\right)$ (i.e., the initial angle of a projectile), determine $\Delta\theta$.

Recall: $\frac{d}{dx}\arctan u = \frac{1}{1+u^2}\frac{du}{dx}$. You should choose to define $u = V_{oy}/V_{ox}$.

Prob 6: Given $T = 2\pi\sqrt{\frac{I}{mgh}}$ (i.e., the period of a physical pendulum), find ΔT. Assume g is known.

Prob 7: Given $u^* = \left(1 - \frac{r}{R}\right)^{1/7}$ (i.e., the relative speed of turbulent flow in pipe of size R as a function of radial position r), find Δu^*.