7. Calculate the values of k for the other intervals on scratch paper. However, omit this calculation for the interval in which m_w changes from 0 to 50 g. Some springs cannot contract as much as they would "like to" at small applied forces, because the turns of the helix may interfere with each other. Consequently, measurements of the spring constant may be misleading when the applied force is too small. Record all your values of k in the data table.

8. Calculate below the average value of k. Also record the result of the calculation in the data table.

$$\text{Average k} = \frac{\text{Sum of values of k}}{\text{Number of values added}}$$

$$= \frac{17500 + 16896.55 + 16333.33 + 16333.33}{4} \quad \text{(Substitute)}$$

$= \underline{16765.8}$ dynes/cm (Final answer)

9. Calculate the predicted period of oscillation (T_p) when a 100 g mass is placed on the weight holder. ($m_w = 100$ g, $\pi = 3.142$*, k from step 8)

$$M = m_w + m_{wh} + \tfrac{1}{3} m_s$$

$$= 100 + 245 + \tfrac{1}{3}(3.5) \quad \text{(Substitute)}$$

$= \underline{124.83}$ g (Answer)

$$T_p = 2\pi\sqrt{\frac{M}{k}} = 2\pi\sqrt{\frac{124.83}{16765.80}} \quad \text{(Substitute)}$$

$= \underline{1.71}$ s (Final answer)

10. Actually measure the period of oscillation with the 100 g mass sitting on the weight holder. Set the mass in vertical oscillation and use a stopwatch to measure the time required for 50 complete cycles of oscillation. (The mass has undergone one complete cycle of oscillation when it has moved from the lowest position, to the highest position, and back to the lowest position.) Then divide by 50 to get the measured value of the period of oscillation.

Time for 50 cycles $= \underline{18.54}$ s

$$T_m = \frac{\text{Time for 50 cycles}}{50} = \frac{18.54}{50} \quad \text{(Substitute)}$$

$= \underline{0.37}$ s (Final answer)

*Some calculators have a π button.