12. Make a sample calculation of the average velocity between t = 0 and t = 1/30 sec. The time interval Δt is 1/30 sec, and you found the change in displacement Δs in step 10.

$$v_{av} = \frac{\Delta s}{\Delta t} = \quad \text{(Substitute)}$$

$$= \underline{\quad 30 \quad} \text{ cm/s} \quad \text{(Final Answer)}$$

This average velocity is also equal to the instantaneous velocity at the midpoint of the time interval, that is, at t = .5/30 sec. Now calculate the average velocity for each of the remaining intervals. (Use scratch paper if necessary.) Remember that dividing by 1/30 is the same as multiplying by 30. Record all values of v in the Data Table at the end of this section.

13. Make a sample calculation of Δv for the first two entries of v on the Data Table. This is the change in velocity between t = .5/30 sec and t = 1.5/30 sec.

$$\Delta v = v_2 - v_1 = \quad \text{(Substitute)}$$

$$= \underline{\quad 1 \quad} \text{cm/s} \quad \text{(Final Answer)}$$

Continue calculating values of Δv by subtracting successive values of v in the Data Table. Record all these values of Δv in the Data Table.

14. Make a sample calculation of the acceleration for the time interval from t = .5/30 s to t = 1.5/30 s. You calculated Δv in step 13. Obviously, Δt is still 1/30 s.

$$a = \frac{\Delta v}{\Delta t} = \quad \text{(Substitute)}$$

$$= \underline{\quad 30 \quad} \text{ cm/s}^2 \quad \text{(Final Answer)}$$

Continue calculating the acceleration for each interval in the Data Table. Remember that dividing by 1/30 is the same as multiplying by 30. Record all of these values of a in the Data Table.

15. Calculate the sum of the values of a and the average acceleration. Record them in the places provided in the Data Table.

$$a_{av} = \frac{\text{Sum of values of a}}{\text{Number of values added}}$$

$$= \quad \text{(Substitute)}$$

$$= \underline{\quad\quad} \text{ cm/s}^2 \quad \text{(Final Answer)}$$

16. Calculate the percent error in your value of the average acceleration. The accepted value of the acceleration of gravity is g = 980 cm/s^2.

$$\% \text{ Error} = \frac{a_{av} - 980}{980} \times 100 = \quad \text{(Substitute)}$$

$$= \underline{\quad\quad} \% \quad \text{(Final Answer)}$$

Record the percent error in the Data Table.