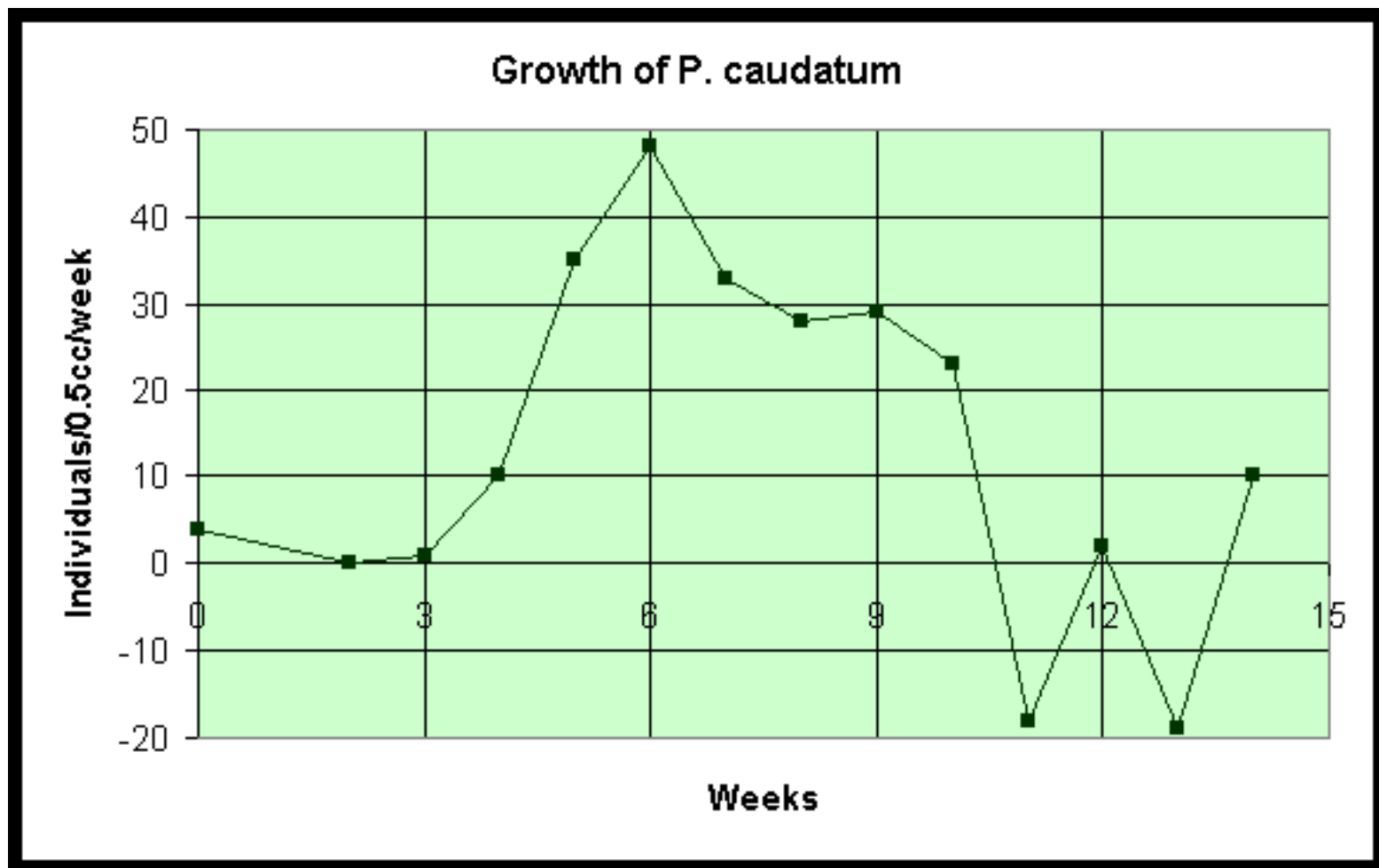


2. From Example 2 of the Worked Examples section on the growth *Paramecium caudatum*, we have the following table.

week	individuals	week	individuals	week	individuals
0	2	6	56	11	217
2	10	7	104	12	199
3	10	8	137	13	201
4	11	9	165	14	182
5	21	10	194	15	192

a. The average growth in number per week over the first 10 weeks will be  $\frac{194-2}{10-0} = \frac{192}{10} = 19.2$  ind./0.5cc/week. For the fifth week, the rate will be  $\frac{56-21}{6-5} = 35$  ind./0.5cc/week.

b. Looking at the graph below, the most rapid increase (steepest slope) is between 6 and 7 weeks at  $\frac{104-56}{7-6} = 48$  ind./0.5cc/week. The most rapid decrease is between 13 and 14 weeks at  $\frac{182-201}{14-13} = -19$  ind./0.5cc/week.



3. From Example 3 of the Worked Examples section for a falling ball.

time(sec)	distance(cm)	time(sec)	distance(cm)
0	0	0.5	123
0.1	5	0.6	176
0.2	19	0.7	240
0.3	44	0.8	313
0.4	78	0.9	396

a. The graph of the data is as below and it forms a parabola.

b. The average velocity for  $t \in [0, 0.3]$  is given by  $v(0.15) \simeq \frac{44-0}{0.3-0} = 146.67$  cm/sec. For  $t \in [0.3, 0.6]$ ,  $v(0.45) \simeq \frac{176-44}{0.6-0.3} = 440$  cm/sec. For  $t \in [0.6, 0.9]$ ,  $v(0.75) \simeq \frac{396-176}{0.9-0.6} = 733.3$  cm/sec. The points that are plotted below are  $(0.15, 146.67)$ ,  $(0.45, 440)$  and  $(0.75, 733.3)$ . These points fall on the line  $v = 977t$ .

