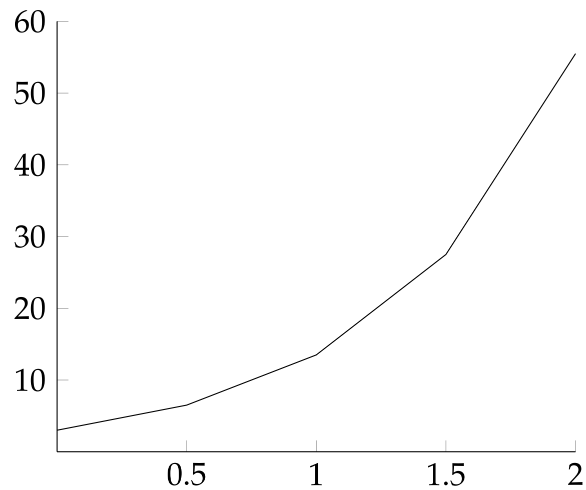
Part 1

1.4, Problem 2

$$\frac{dy}{dt} = 2y + 1$$
$$y(0) = 3$$
$$0 \leqslant t \leqslant 2$$
$$\Delta t = 0.5$$

k	t	y	f
0	0	3	7
1	0.5	6.5	14
2	1	13.5	28
3	1.5	27.5	56
4	2	55.5	—

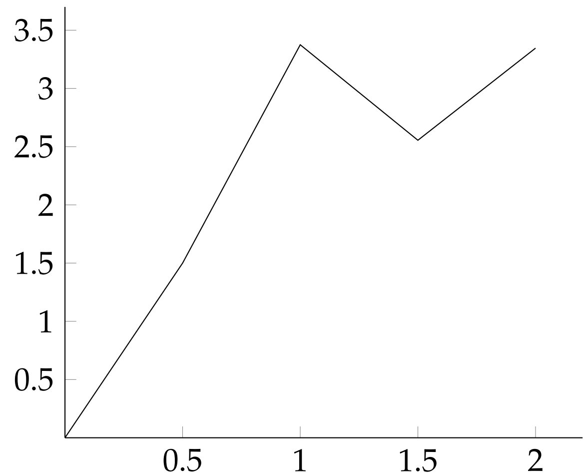


Excel was used for calculation and TikZ/PGF was used to graph the coordinate outcomes from Euler's Method.

1.4, Problem 6

$$\frac{dw}{dt} = (3 - w)(w + 1)$$
$$w(0) = 0$$
$$0 \leqslant t \leqslant 2$$
$$\Delta t = 0.5$$

k	t	w	f
1	0	3	3
2	0.5	1.5	3.75
3	1	3.375	−1.641
4	1.5	2.555	1.583
5	2.0	3.346	—

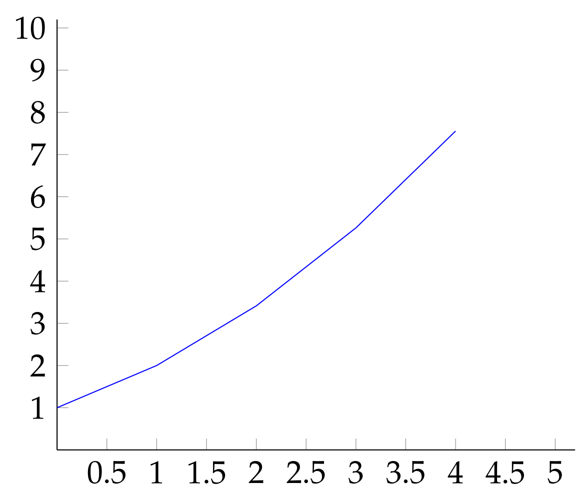


1.4, Problem 11

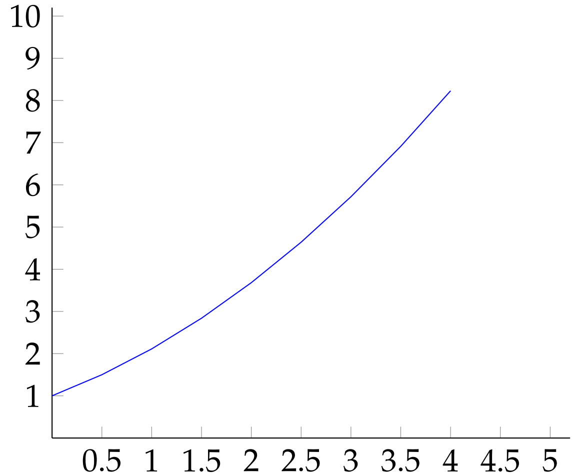
The equilibrium solutions to $\frac{dw}{dt} = (3-w)(w+1)$ occur for $w(t) = 3$; however, we had our initial condition at $w(0) = 0$ and yet the solution seemed to oscillate around the equilibrium point (rather than approaching it from below, as we would expect for a solution that started below the equilibrium value).

1.4, Problem 15

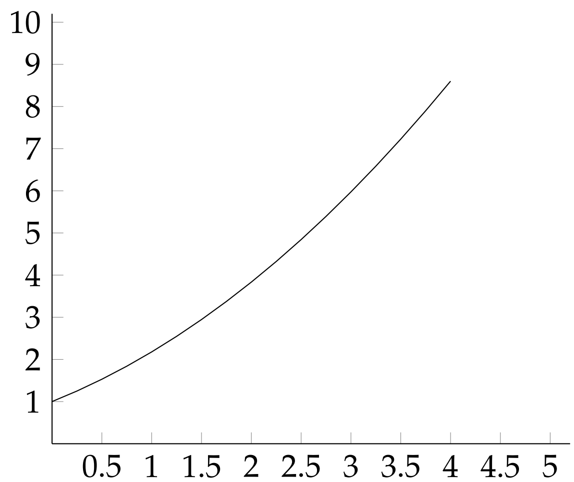
- $\Delta t = 1$:



- $\Delta t = 0.5$:



- $\Delta t = 0.25$:



The actual solution to the initial value problem should be some quadratic function.