Manual Runge-Kutta.

Below is a table solving the differential equation

$$\frac{\mathrm{d}x}{\mathrm{d}t} = -1.2x + 7e^{-0.3t}$$

for $t = [0, 1.5]$s, $h = 0.5\,\mathrm{s}$, $x(t = 0) = 3$. The first calculation is shown in equation form, the rest show only their evaluation.

time t	k_1	k_2	x
0	$\frac{1}{2}\left(-1.2 \times 3 + 7e^{-0.3\times 0}\right)$	$\frac{1}{2}\left(-1.2\left(3 + \frac{k_1}{2}\right) + 7e^{-0.3+\frac{h}{2}}\right)$	3
0.5	0.65022	0.23748	3.9371
1	0.088104	-0.12568	4.1746
1.5	-0.19764	-0.29960	4.0489
2			3.7493