Example of Euler's Method

IVP: $\frac{dy}{dx} = 2xy$

$y(0) = 2$

step size: $h = 0.1$

x	y	y′	Δy = h*y′
0	2	0	0
0.1	2	0.4	0.04
0.2	2.04	0.816	0.0816
0.3	2.1216	1.27296	0.127296
0.4	2.248896	1.799117	0.179912
0.5	2.428808	2.428808	0.242881
0.6	2.671688	3.206026	0.320603
0.7	2.992291	4.189207	0.418921
0.8	3.411212	5.457939	0.545794
0.9	3.957006	7.12261	0.712261
1	4.669267		

Comparison of the results obtained from Euler's Method by using various step sizes.

IVP ; $y' = 2 \times y \quad , \quad y(0) = 2$

x	h = 0.1 y	h = 0.05 y	h = 0.01 y	h = 0.001 y	Correct y *
0	2	2	2	2	2
0.1	2	2.0100	2.0181	2.0199	2.0201
0.2	2.0400	2.0606	2.1774	2.0812	2.0816
0.3	2.1216	2.1543	2.1814	2.1877	2.1883
0.4	2.2489	3.2966	2.3367	2.3460	2.3470
0.5	2.4288	2.4959	2.5532	2.5666	2.5681
0.6	2.6717	2.7649	2.8455	2.8645	2.8667
0.7	2.9923	3.1213	3.2347	3.2616	3.2646
0.8	3.4112	3.5902	3 7503	3.7886	3.7930
0.9	3.9570	4.2071	4.4345	4.4896	4.4968
1	4.6693	4.5857	5.3476	5.4275	5.4366

* $y = 2\, e^{x^2}$