SP24 MATH 212 **OA LT9**

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LT6 I can implement numerical methods such as Euler's method.

1. Consider the differential equation and initial condition

$$\frac{dy}{dt} = y'(t) = 1 + 2y, \; y(0) = 2$$

a. **What is** $y'(0, 0)$? Record this value in the table below.

$1+2(0) = 1$

b. Recall that Euler's method allows us to approximate the solution at the next time step using information about the current approximation to the solution plus information about the forward trajectory given by the derivative at the current time step:

$$y_{n+1} = y_n + h \cdot y'(t_n, y_n).$$

Use Euler's method, with a step size of $h = \Delta t = 0.2$ to approximate the solution $y'(0.6)$. Record your values by completing this table.

t_i	y_i	$y'(t_i, y_i)$	$h = \Delta y$
0	2	1	0
0.2	3	5	1
0.4	4.4	7	1.4
0.6	6.38	N/A	N/A

$y_n = y_{n-1} + h(f(x_{n-1}, y_{n-1}))$

$y_0 = 2$ previous

$y_{0.2} = 2 + 0.2(1+2(2)) = 3$

$y_{0.4} = 3 + 0.2(1+2(3)) = 4.4$

$y_{0.6} = 4.4 + 0.2(1+2(4.4)) = 6.38$

$y(0.6) = 6.38$