

7.1 Day 2 Euler's (Monday 11/25)

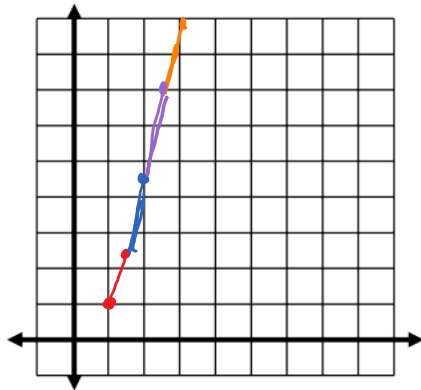
Saturday, November 23, 2019 6:57 PM

7.1 Euler's Approximation Method

- 1) Starting at (1, 1) and using $\Delta x = .5$, generate the next three points of the Euler line for $\frac{dy}{dx} = 2x + 1$.

Show work below table.

(x, y)	$f'(x, y)$	Δx or h	$\Delta y = f'(x, y)\Delta x$	$(x + \Delta x, y + \Delta y)$
(1, 1)	3	0.5	$3(\frac{1}{2}) = 3/2$	(1.5, 2.5)
(1.5, 2.5)	4	0.5	$4(\frac{1}{2}) = 2$	(2, 4.5)
(2, 4.5)	5	0.5	$5(\frac{1}{2}) = 2.5$	(2.5, 7)
(2.5, 7)	6	0.5	$6(\frac{1}{2}) = 3$	(3, 10)



$$f(3) \approx 10$$

$$\int dy = \int (2x + 1) dx$$

$$y = x^2 + x + C$$

$$1 = 1 + 1 + C \quad C = -1$$

$$y = x^2 + x - 1$$

$$y(3) = 11$$

- 2) Starting at (1, 2) and using $\Delta x = .5$, generate the next three points of the Euler line for $\frac{dy}{dx} = x + \frac{y}{2}$.

Show work below table.

(x, y)	$f'(x, y)$	Δx or h	$\Delta y = f'(x, y)\Delta x$	$(x + \Delta x, y + \Delta y)$
(1, 2)	2	0.5	1	(1.5, 3)
(1.5, 3)	3	0.5	1.5	(2, 4.5)
(2, 4.5)	4.25	0.5	2.125	(2.5, 6.625)
(2.5, 6.625)	5.8125	0.5	2.90625	(3, 9.53125)

