

**Euler's Method Exercises\***  
Math 112

1. Suppose that  $y$  is a function of  $x$  whose derivative is given by  $y' = \frac{y}{x^2}$  and that  $y = -\frac{1}{2}$  when  $x = 1$ . Use Euler's method with  $\Delta x = .1$  to approximate the value of  $y$  when  $x = 2$ . **Fill in the table below** with the appropriate values and **plot a graph** of your results.

Old point		slope at old point	Change in y	new $x$	new $y$
old $x$	old $y$	$y'$ (old point)	$\Delta y = \text{slope} \cdot \Delta x$	old $x + \Delta x$	old $y + \Delta y$

Graph:

\*This worksheet is adapted from a worksheet written by Carol Schumacher.

2. Suppose that  $y$  is a function of  $t$  whose derivative is given by  $y' = 3y^2$  and that  $y = -1$  when  $t = 0$ . Use Euler's method with  $\Delta t = \frac{1}{2}$  to approximate the value of  $y$  when  $t = 3$ . Then take  $\Delta t = -\frac{1}{2}$  and approximate the value of  $y$  when  $t = -2$ .

Old point		slope at old point	Change in y	new $t$	new $y$
old $t$	old $y$	$y'(\text{old point})$	$\Delta y = \text{slope} \cdot \Delta t$	old $t + \Delta t$	old $y + \Delta y$

Old point		slope at old point	Change in y	new $t$	new $y$
old $t$	old $y$	$y'(\text{old point})$	$\Delta y = \text{slope} \cdot \Delta t$	old $t + \Delta t$	old $y + \Delta y$

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