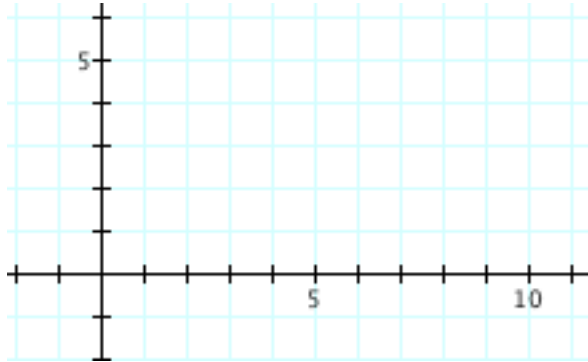


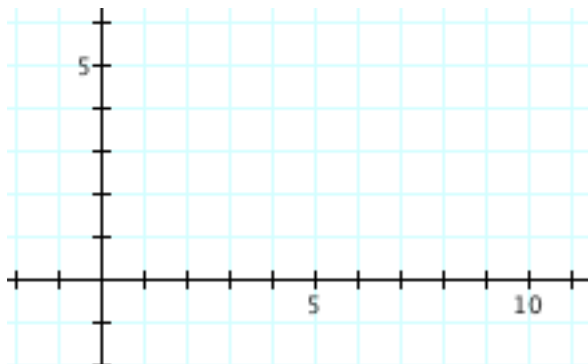
Name _____

1. a) Graph the following $f(t) = \begin{cases} 2 & 0 < t < 2 \\ -1 & 2 \leq t < 3 \\ 1 & t \geq 3 \end{cases}$ and write $f(t)$ using the $u(t - a)$ formalism.



- b) Solve the IVP $y' + y = f(t)$; $y(0) = 0$, where $f(t)$ is as above.

- c) Graph the solution found in b).



2. Find a power series solution for the differential equation $y' - y = 2$ **and** recognize this solution as the series expansion of a familiar function.

3. Find a power series solution for the IVP $y - y' = 0$; $y(0) = 2$ **and** recognize this solution as the series expansion of a familiar function.

4. Use Taylor's Series to find a solution to

$$(x - 1)y''' + y'' + (x - 1)y' + y = 0 ; y(0) = 0, y'(0) = 1 \text{ and } y''(0) = 0 .$$

Recognize this solution as the series expansion of a familiar function.

5. Use the method of power series to find a solution to $xy' = y$.