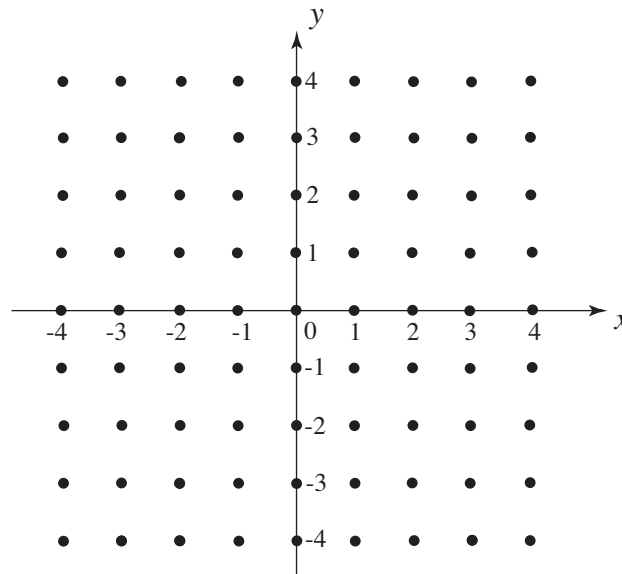**Quiz**   **Name**

Consider the differential equation $y' = x - y$ with initial condition $y(-4) = 2$.

1. Draw the slope segments of its slope field at the points $(-4, 3), (-3, -1), (-2, -2), (0, -1)$, $(1, 0), (2, 1), (3, 2)$, and $(4, 3)$ into the grid below. Use this information to sketch the particular

solution of the equation into the grid.

2. Use the method of integrating factors to show that the particular solution of the equation is $f(x) = x + 7e^{-(x+4)} - 1$.

3. Show that the graph of $f(x)$ is decreasing over the interval $[-4, \ln 7 - 4]$ reaches its minimum value at the point $(\ln 7 - 4, \ln 7 - 4)$ and is increasing over $[\ln 7 - 4, 4]$. Show that the graph is concave up throughout and that the line $y = x - 1$ is an asymptote. Plot a few points and compare the graph of the solution referred to in (2) to the sketch you drew in (1). (Note that $\ln 7 - 4 \approx -2.05$.)