Name: _____

Directions: Show all work. No credit for answers without work.

1. Consider the IVP $y' = 2y + 1$ with $y(0) = -1$.

   (a) [**3 points**] Use Euler's Method with step size $h = 1/2$ to approximate the solution at $t = 1/2$, $t = 1$, and $t = 3/2$.

   (b) [**2 points**] Extend Euler's Method in a natural way to approximate the solution at $t = -1/2$.

   (c) [**1 point**] Are the approximations found in parts (a) and (b) larger than, smaller than, or equal to the corresponding true values $y(-1/2)$, $y(1/2)$, $y(1)$, $y(3/2)$? (Your answer may vary from approximation to approximation.)

2. [**2 parts, 1 point each**] Convert the following complex numbers into Cartesian form $a + bi$.

    (a) $\frac{3+i}{-2+5i}$

    (b) $e^{(\pi+i)(\pi/2+i)}$

3. [**2 parts, 1 point each**] Convert the following complex numbers into polar form $re^{i\theta}$.

    (a) $3i$

    (b) $\sqrt{3} + i$