Problem statement Find the general solution of the differential equation

$$e^{-y}\frac{dy}{dt} + 2\cos t = 0\,.$$

a) Sketch the solutions corresponding to several values of the constant of integration, C. Does every value of the constant of integration correspond to a solution curve? If not, which C's do occur?

b) Do all the solutions have the same domain? Explain.

c) Sketch the direction field associated with this equation and superimpose your sketches of solution curves on the direction field. (Suggestion for sketching the direction field: sketch at several points along the line $t = 0$, then at the corresponding points along the lines $t = \pi/6$, $\pi/3$, $\pi/2$, etc.)