4.6 #1

"standard form"

$y'' + y = \sec(x)$

$m^2 + 1 = 0 \quad m = \pm i$

$y_c = c_1 y_1 + c_2 y_2$ $\quad y_1 = \sin(x)$, $y_2 = \cos(x)$

$\boxed{y = y_1 u_1 + y_2 u_2}$

$y_1 u_1' + y_2 u_2' = 0$

$y_1' u_1' + y_2' u_2' = \sec(x)$

$\sin(x) u_1' + \cos(x) u_2' = 0$

$\cos(x) u_1' - \sin(x) u_2' = \sec(x)$

$\sin(x)^2 u_1' + \sin(x)\cos(x) u_2' = 0$

$\cos(x)^2 u_1' - \sin(x)\cos(x) u_2' = 1$

$(\sin^2(x) + \cos^2(x)) u_1' = 1 \qquad \boxed{u_1' = 1}$

$\boxed{u_2' = -\sin(x)/\cos(x)}$

$\boxed{u_1 = x + c_1} \qquad \boxed{u_2 = \ln(\cos(x)) + c_2}$