3.5 #2 $\quad y'' + 2y' + 5y = 3\sin 2t$

$$y_p = A\sin 2t + B\cos 2t$$
$$y_p' = 2A\cos 2t - 2B\sin 2t$$
$$y_p'' = -4A\sin 2t - 4B\cos 2t$$

$$y_p'' + 2y_p' + 5y_p = 3\sin 2t$$

$$(-4A - 4B + 5A)\sin 2t + (-4B + 4A + 5B)\cos 2t = 3\sin 2t$$

$-4A - 4B + 5A = 3$ coeff of $\sin 2t$

$-4B + 4A + 5B = 0$ coeff on $\cos 2t$

$$4\begin{cases} A - 4B = 3 \\ 4A + B = 0 \end{cases}$$

$17A = 3$ $\qquad B = -4A = -12/17$

$A = 3/17$

$$y = y_H + y_p$$
$$= c_1(e^{-t}\cos 2t) + c_2(e^{-t}\sin 2t)$$
$$+ \frac{3}{17}\sin 2t - \frac{12}{17}\cos 2t$$