HW 6.2

2. $c_1e^x + c_2e^{-x} + c_3e^{3x}$

6. $c_1e^{-x} + c_2e^x\cos x + c_3e^x\sin x$

14. $r^4 + 2r^3 + 10r^2 + 18r + 9 = 0$

[sin 3x is a solution
$\Leftrightarrow$ r^2+9 is a factor of ch. poly.

$$\begin{array}{r|l} & r^2 + 2r + 1 \\ r^2+9 & r^4 + 2r^3 + 10r^2 + 18r + 9 \\ & r^4 + 9r^2 \\ \hline & 2r^3 + r^2 + 18r \\ & 2r^3 + 18r \\ \hline & r^2 + 9 \\ & r^2 + 9 \\ \hline & 0 \end{array}$$

$\therefore$ ch. eq : $(r^2+9)(r+1)^2 = 0$

$r = -1, -1, \pm 3i$

$\therefore$ $y = (c_1 + c_2x)e^{-x} + c_3\cos 3x + c_4\sin 3x$

15. $(D-1)^2(D+3)[(D+1)^2+2^2][y] = 0$

$r = 1, 1, -3, -1 \pm 2i, -1 \pm 2i$

$y = (c_1+c_2x)e^x + c_3e^{-3x}$
$+ (c_4+c_5x)e^{-x}\cos 2x + (c_6+c_7x)e^{-x}\sin 2x$

16. $y = (c_1+c_2x)e^{-x} + (c_3+c_4x+c_5x^2)e^{6x}$
$+ c_6e^{-5x} + c_7\cos x + c_8\sin x$
$+ c_9\cos 2x + c_{10}\sin 2x$

20. $y = e^{-x} - e^{-2x} + e^{4x}$