4.5

Ex Find the differential operator that annihilates

(a) $1 - 5x^2 + 8x^3$ → leading term

$\therefore D^4 x^3 = 0$

$D^4 (1 - 5x^2 + 8x^3) = 0$

(b) $x^n e^{\alpha x} \cos \beta x = e^{-3x}$

$n = 1$

$\alpha = -3$

$\beta = 0$

$\left[D^2 - 2(-3)D + (-3)^2 + (0)^2\right] e^{-3x}$

$(D^2 - 6D + 9) e^{-3x} = 0$