The operator $D$ denotes the derivative; so $D^n(y) = y^{(n)}$. The operator $I$ is the identity operator; so $I(y) = y$. For example,

$$(D^2 + D - I)(D + 3I)y = (D^3 + 4D^2 + 2D - 3I)y = y^{(3)} + 4y^{(2)} + 2y' - 3y.$$  

For each of the following differential equations, first give the form of the general solution. Then solve for a particular solution and give the general solution using your particular solution.

1) $(D^2 + D - I)(D + 3I)y = e^x.$
2) $(D^2 + D - I)(D + 3I)y = e^{-3x}.$
3) $(D^3 - I)y = x \cos(x)$
4) $(D^3 - I)y = \exp(x)$
5) $(D^2 + D - I)(D^2 + 2D + 4I)y = x^2.$
6) $(D^2 + D - I)(D^2 + 2D + 4I)y = x^2e^x.$