1. Find the complementary function $y_c(x)$ and the general solution of the associated homogeneous equation. Then write down the correct form for $y_p(x)$, the particular solution. You do not need to find the unknown constants in $y_p(x)$, but you must identify the correct form, whether in case I (*no duplication of terms in* $y_c(x)$) or in case II (*with duplication*).

a) $y'' + 9y = x + 2$;

b) $y'' - 3y' - 4y = 17e^{4x}$;

c) $y'' - 2y' + y = -\sin 3x - 2\cos x$;

d) $y''' - 3y'' + 9y' + 13y = e^{2x} + \sin 3x$;

e) $y'' - 2y' + 5y = e^x \cos 2x$;

2. Solve by variation of parameters $y'' - y = 2e^x$.

3. Solve by variation of parameters $(3x^3 + x)y'' + 2y' - 6xy = 4 - 12x^2$.

4. Solve $(x^2 + 1)y'' - 2xy' + 2y = 0$.