1. Write the general form for the solution.
   a. $y'' + 49y = 0$

      $(r^2 + 49) = 0$

      $r = \pm 7i$

      $Y = C_1 \sin 7t + C_2 \cos 7t$

   b. $y'' - 5y' = 0$

      $r^2 - 5r = 0$

      $r(r-5) = 0$

      $r = 0, r = 5$ $\quad Y = C_1 + C_2 e^{5t}$

   c. $y'' - 6y' + 9y = 0$

      $r^2 - 6r + 9$

      $(r-3)^2 = 0$

      $Y = C_1 e^{3t} + C_2 t e^{3t}$

2. For each example, write the appropriate form for the trial solution when using the method of undetermined coefficients. Do NOT solve for the coefficients. (Refer to your answers above to get started.)

   a. $y'' + 49y = e^{5t} + t^2 + 1$

      → $Y_P = Ae^{5t} + Bt^2 + Ct + D$

      $\cancel{Y' = 5Ae^{5t} + 2Bt + C}$

      $\cancel{Y'' = 25Ae^{5t} + 2B}$

   b. $y'' + 49y = 6\sin 7t$

      $Y_P = A \sin 7t + B\cos 7t$ → These are both a sol'n to the homogen. sol'n

      so $Y_P = At\sin 7t + Bt\cos 7t$

   c. $y'' - 5y' = 6\sin 7t$

      $Y_P = A\sin 7t + B\sin 7t$

   d. $y'' - 5y' = e^{5t} + t^2 + 1$

      x $Y_P = Ae^{5t} + Bt^2 + Ct + D$ → theres a homogen. sol'n

      $Y_P = Ate^{5t} + Bt^3 + Ct^2 + Dt$

   e. $y'' - 6y' + 9y = e^{5t} + t^2 + 1$

      $Y_P = Ae^{5t} + Bt^2 + Ct + D$