To solve linear DE $ay'' + by' + cy = g_1 + g_2 + g_3$

Step 1: Solve homogeneous version: $ay'' + by' + cy = 0$ implies
$ar^2 + br + c = 0$ implies ... $y = c_1\phi_1 + c_2\phi_2$.

Step 2a: Find one non-homogeneous solution, $y = f_1$, to $ay'' + by' + cy = g_1$
Step 2b: Find one non-homogeneous solution, $y = f_2$, to $ay'' + by' + cy = g_2$
Step 2c: Find one non-homogeneous solution, $y = f_3$, to $ay'' + by' + cy = g_3$

Step 3: Combine all solutions to create the general solution to the non-homogeneous DE:

$$y = c_1\phi_1 + c_2\phi_2 + f_1 + f_2 + f_3$$

Last step: If IVP, plug in initial values to find the constants c_1 and c_2.

Guess a possible non-homog soln for the following DEs:

Note homogeneous solution to $y'' + 2y' + y = 0$ is
$y = c_1e^{-t} + c_2te^{-t}$ since $r^2 + 2r + 1 = (r + 1)(r + 1) = 0$

1.) $y'' + 2y' + y = 4e^{2t}$

Guess: ______________________________

2.) $y'' + 2y' + y = 4e^{t}$

Guess: ______________________________

3.) $y'' + 2y' + y = 4e^{-t}$

Guess: ______________________________

4.) $y'' + 2y' + y = t$

Guess: ______________________________

5.) $y'' + 2y' + y = t + 1$

Guess: ______________________________

6.) $y'' + 2y' + y = 4sin(2t)$

Guess: ______________________________

7.) $y'' + 2y' + y = 4sin(2t) + 5cos(2t)$

Guess: ______________________________

8.) $y'' + 2y' + y = 4sin(2t) + 5cos(3t)$

Guess for step 2a: ______________________________

Guess for step 2b: ______________________________

9.) $y'' + 2y' + y = 4sin(2t) + t + 1$

Guess for step 2a: ______________________________

Guess for step 2b: ______________________________

10.) $y'' + 2y' + y = 4tsin(2t)$

Guess: ______________________________

11.) $y'' + y = 4sin(2t)$

Guess: ______________________________

12.) $y'' + y = 4sin(t)$

Guess: ______________________________