NAME: ───────────────────────

Test Prep 4

Here is a problem where you can practice undetermined coefficients. If you finish this page, try the problems on the back. You have 10 minutes.

Find the solution to $y'' + 4y = 3t^2$ with $y(0) = 0$, $y'(0) = 0$

Extra problems for you to think about and attempt (not required for the official test prep):

1. Suppose you are solving a linear system $y'' + p(t)y' + q(t)y = 0$ with $t > 0$ and you find/guess three different solutions $y_1(t) = 2t^2 - 1$, $y_2(t) = 4 - 8t^2$, $y_3(t) = t^2$.

   (a) Do $y_1(t)$ and $y_2(t)$ form a fundamental set of solutions?

   (b) Do $y_1(t)$ and $y_3(t)$ form a fundamental set of solutions?

   (c) Write down the general solution to the equation.
       Simplify your answer as much as possible.

2. Find the general solution to $y'' + 4y' - 5y = 3 + 6e^t$.
   (Here are two homogeneous solutions: $y_1(t) = e^t$ and $y_2(t) = e^{-5t}$.)