Section 2: Non-homogeneous differential equations

Crucial points

1. **Check your work**
   Solving non-homogeneous differential equations involve a number of steps and careless errors are easily made at any stage, especially when differentiating. Check your solution with the original differential equation and, in the case of a particular solution, with the initial conditions.

2. **Don't confuse the terms *particular integral* and *particular solution***
   Check the glossary if you are unsure.

3. **Make sure you use the correct form of trial function**
   Be especially careful in the special case where the function on the right-hand side is of the same form as one of the complementary functions: remember to multiply the trial function by the independent variable (usually x or t) in these special cases.

4. **When using the initial conditions to find the values of the unknown constants, make sure you use the whole solution**
   When you are dealing with a non-homogeneous equation, you must find the full general solution first, consisting of the complementary function and the particular integral, and then substitute initial conditions into this full general solution to find the particular solution. Do not try to find the unknown constants when you have found the complementary function only!