The following ODE can be solved easily with Laplace method. Laplace method is the easy way to reach exact solution of some ODEs.

Solution:

*ℒ*

One of the answer which called public answer is S=1 but this is not answer which work for us.

The second answer is:

Now we can get Laplace inverse to find a solution which we need.

*ℒ -1*

Another way to find a solution for this ODE is to do Change of variables.

If we define a and take integral we will reach the same solution.