29. \( \frac{dy}{dx} = ye^{-x^2} \), \( y(4) = 1 \)

i) The DE is separable: \( \frac{dy}{y} = e^{-x^2} \, dx \)

\[ \Rightarrow \int \frac{dy}{y} = \int e^{-x^2} \, dx + C \]

\[ \Rightarrow \ln|y| = \int e^{-x^2} \, dx + C \]

ii) Note that we cannot get an antiderivative for the right-hand-side, and hence we leave it in integral form.

iii) In order to find \( C \) so that the IC is satisfied, we proceed as follows:

\[ \ln|y| = \int_{4}^{x} e^{-t^2} \, dt + C \]

\[ \ln(1) = \int_{4}^{1} e^{-t^2} \, dt + C \]

\[ 0 = 0 + C \quad \Rightarrow \quad C = 0 \]

\[ \therefore \ln|y| = \int_{4}^{x} e^{-t^2} \, dt \]

iv) \( \therefore \) Soln. to the IVP is:

\[ y(x) = e^{\int_{4}^{x} e^{-t^2} \, dt} \]