Solve the equation
\[(x + xy^2) \, dx + e^{x^2} \, y \, dy = 0.\]

**SOLUTION:** The equation is separable. It can be solved by separating the variables, as follows (we use the same symbol, \(C\), for the arbitrary constant):

\[
x(1 + y^2) \, dx = -e^{x^2} \, y \, dy
\]

\[\Leftrightarrow -xe^{-x^2} \, dx = \frac{y}{1 + y^2} \, dy\]

\[\Leftrightarrow -\int xe^{-x^2} \, dx = \int \frac{y}{1 + y^2} \, dy\]

\[\Leftrightarrow \frac{1}{2}e^{-x^2} + C = \frac{1}{2} \log(1 + y^2)\]

\[\Leftrightarrow y = \pm \sqrt{C \exp(e^{-x^2}) - 1}.\]

**Remark.** There are no constant solutions. Also note that we divided by a function of \(y\) which is never zero.