1. Solve the following equation

\[3^{-x^2+2x} = 3\]

Since the bases are the same just set the exponents equal to each other and solve that equation.

\[-x^2 + 2x = 1\]
\[x^2 - 2x + 1 = 0\]
\[(x - 1)^2 = 0\]

So \(x = 1\).

2. Given that \(f(x) = \frac{x - 1}{x + 2}\) and \(g(x) = x^2 + 2x - 1\) find both \((f \circ g)(x)\) and \((g \circ f)(x)\).

\[
(f \circ g)(x) = f(g(x)) = \frac{(x^2 + 2x - 1) - 1}{(x^2 + 2x - 1) + 2} = \frac{x^2 + 2x - 2}{x^2 + 2x + 1}\]

and

\[
(g \circ f)(x) = g(f(x)) = \left(\frac{x - 1}{x + 2}\right)^2 + 2 \left(\frac{x - 1}{x + 2}\right) - 1 = \frac{2x^2 - 4x - 7}{(x + 2)^2}\]