Solve the equation
\[ \log_{12} \log_2 \log_3 \frac{3}{2 - 4x} = 0. \]

**Solution:**
For \( x \) to be in the domain of the equation, we must have that
\[
\begin{align*}
  x \neq \frac{1}{2} \\
  \frac{3}{2 - 4x} > 0 \\
  \log_3 \frac{3}{2 - 4x} > 0 \\
  \log_2 \log_3 \frac{3}{2 - 4x} > 0.
\end{align*}
\]

From this obtain the system
\[
\begin{align*}
  x \neq \frac{1}{2} \\
  x < \frac{1}{2} \\
  \frac{3}{2 - 4x} > 1 \\
  \log_3 \frac{3}{2 - 4x} > 1.
\end{align*}
\]
and therefore further the system

\[
\begin{align*}
  x &\neq \frac{1}{2} \\
x &< \frac{1}{2} \\
\frac{3}{2-4x} &> 1 \\
\frac{3}{2-4x} &> 3.
\end{align*}
\]

Solving for \(x\), we therefore obtain that the domain \(D_x\) of the equation is given by

\[D_x = \left\{ x : \frac{1}{4} < x < \frac{1}{2} \right\}.
\]

Since

\[\log_{12} \left( \log_2 \log_3 \frac{3}{2-4x} \right) = 0\]

it follows that

\[\log_2 \log_3 \frac{3}{2-4x} = 1.
\]

From

\[\log_2 \left( \log_3 \frac{3}{2-4x} \right) = 1\]

we have that

\[\log_3 \frac{3}{2-4x} = 2.
\]

From the last equation we now obtain that

\[\frac{3}{2-4x} = 9\]

and solving for \(x\) we therefore have that

\[x = \frac{5}{12}.
\]

Since \(\frac{5}{12} \in D_x\), it follows that \(x = \frac{5}{12}\) is the solution to the equation.