**Derivative of** \( e^x \tan^{-1} x \)

Finally, in the first lecture I promised you that you’d learn to differentiate *anything*—even something as complicated as

\[
\frac{d}{dx} e^x \tan^{-1} x
\]

So let’s do it!

\[
\frac{d}{dx} e^{uv} = e^{uv} \frac{d}{dx} (uv) = e^{uv} (u'v + uv')
\]

Substituting,

\[
\frac{d}{dx} e^{x \tan^{-1} x} = e^{x \tan^{-1} x} \left( \tan^{-1} x + x \left( \frac{1}{1 + x^2} \right) \right)
\]