Example: \( \lim_{x \to 0} \frac{\sin 5x}{\sin 2x} \)

This is similar to an example we saw earlier in the course. Here \( f(x) = \sin 5x \), \( g(x) = \sin 2x \), and \( a = 0 \). Since \( f(a) = g(a) = \sin 0 = 0 \), we can apply l’Hôpital’s rule and find this limit:

\[
\lim_{x \to 0} \frac{\sin 5x}{\sin 2x} = \lim_{x \to 0} \frac{5 \cos 5x}{2 \cos 2x} \quad \text{(l’Hop)}
\]

\[
= \lim_{x \to 0} \frac{5 \cos(5 \cdot 0)}{2 \cos(2 \cdot 0)}
\]

\[
= \frac{5}{2}.
\]