Exercise 1 *Find*

$$\lim_{x\to 0}\left(\frac{\sin(5x)}{8x}\right) = \boxed{5/8}.$$

Hint: *Recall that* $\lim_{x\to 0}\left(\frac{\sin(x)}{x}\right) = 1$. *Multiplying* $\frac{\sin(5x)}{8x}$ *by a clever form of* 1, *namely,* $\frac{5}{5}$, *gives us* $\frac{5}{8}\cdot\left(\frac{\sin(5x)}{5x}\right) = \frac{\sin(5x)}{8x}$. *Thus,* $\lim_{x\to 0}\left(\frac{5}{8}\cdot\left(\frac{\sin(5x)}{5x}\right)\right) = \lim_{x\to 0}\left(\frac{\sin(5x)}{8x}\right)$. *What can you say about* $\lim_{x\to 0}\left(\frac{5}{8}\cdot\left(\frac{\sin(5x)}{5x}\right)\right)$*?*

Hint: *Let* $y = 5x$. *Then since* $\lim_{x\to 0}\left(\frac{5}{8}\cdot\left(\frac{\sin(5x)}{5x}\right)\right) = \lim_{y\to 0}\left(\frac{5}{8}\cdot\left(\frac{\sin(y)}{y}\right)\right)$, *and we know that* $\lim_{y\to 0}\left(\frac{\sin(y)}{y}\right) = 1$, *applying the limit laws yields* $\lim_{y\to 0}\left(\frac{5}{8}\cdot\left(\frac{\sin(y)}{y}\right)\right) = \frac{5}{8}\cdot\lim_{y\to 0}\left(\frac{\sin(y)}{y}\right) = \frac{5}{8}$.