Exercise 1 *Find*

$$\lim_{x\to 0}\left(\frac{\sin(3x)}{x}\right) = \boxed{3}.$$

Hint: *Recall that* $\lim_{x\to 0}\left(\frac{\sin(x)}{x}\right) = 1$. *Multiplying* $\frac{\sin(3x)}{x}$ *by a clever form of* 1, *namely,* $\frac{3}{3}$, *gives us* $3\cdot\left(\frac{\sin(3x)}{3x}\right) = \frac{\sin(3x)}{x}$. *Thus,* $\lim_{x\to 0}\left(3\cdot\left(\frac{\sin(3x)}{3x}\right)\right) = \lim_{x\to 0}\left(\frac{\sin(3x)}{x}\right)$. *What can you say about* $\lim_{x\to 0}\left(3\cdot\left(\frac{\sin(3x)}{3x}\right)\right)$*?*

Hint: *Let* $y = 3x$. *Then since* $\lim_{x\to 0}\left(3\cdot\left(\frac{\sin(3x)}{3x}\right)\right) = \lim_{y\to 0}\left(3\cdot\left(\frac{\sin(y)}{y}\right)\right)$, *and we know that* $\lim_{y\to 0}\left(\frac{\sin(y)}{y}\right) = 1$, *applying the limit laws yields* $\lim_{y\to 0}\left(3\cdot\left(\frac{\sin(y)}{y}\right)\right) = 3\cdot\lim_{y\to 0}\left(\frac{\sin(y)}{y}\right) = 3$.