

$$\lim_{x \rightarrow 0} \frac{\sin 7x}{4x} = \frac{1}{4} \lim_{x \rightarrow 0} \frac{\sin 7x}{x}$$

you don't need a 4x here; you need a 7x, so pull out the 1/4 as a scalar multiple

$$= \frac{1}{4} \lim_{x \rightarrow 0} \left(\frac{\sin 7x}{x} \cdot \frac{7}{7} \right)$$

like we discussed in class, need $\frac{\sin A}{A}$, so multiply by $\frac{7}{7}$ to get 7x in denominator

$$= \frac{7}{4} \lim_{x \rightarrow 0} \left(\frac{\sin 7x}{7x} \right)$$

we don't need the 7 in the numerator, so pull it out as a scalar multiple

$$= \frac{7}{4} \lim_{7x \rightarrow 0} \left(\frac{\sin 7x}{7x} \right)$$

** as $x \rightarrow 0$, $7x \rightarrow 0$

$$= \frac{7}{4} \cdot 1$$

now we can use our special trig limit since we have $\lim_{A \rightarrow 0} \frac{\sin A}{A}$

$$= \frac{7}{4}$$

Similarly,

$$\lim_{x \rightarrow 0} \frac{\tan 5x}{2x} = \frac{1}{2} \lim_{x \rightarrow 0} \frac{\sin 5x}{x \cos 5x}$$

$$= \frac{1}{2} \lim_{x \rightarrow 0} \frac{\sin 5x}{x \cos 5x}$$

$$= \frac{1}{2} \lim_{x \rightarrow 0} \left(\frac{\sin 5x}{x} \cdot \frac{5}{5} \right) \lim_{x \rightarrow 0} \frac{1}{\cos 5x}$$

$$= \frac{5}{2} \lim_{x \rightarrow 0} \left(\frac{\sin 5x}{5x} \right) \lim_{x \rightarrow 0} \frac{1}{\cos 5x}$$

$$= \frac{5}{2} \lim_{5x \rightarrow 0} \left(\frac{\sin 5x}{5x} \right) \lim_{x \rightarrow 0} \frac{1}{\cos 5x}$$

** as $x \rightarrow 0$, $5x \rightarrow 0$

$$= \frac{5}{2} \cdot 1 \cdot 1 = \frac{5}{2}$$