2.1 Limits Analytically (w/Trig)

Practice #1

$$\lim_{x\to 0} \frac{\sin 6x}{5x} = \lim_{x\to 0} \frac{1}{5}\cdot\frac{\sin 6x}{x}$$

$$= \lim_{x\to 0} \frac{1}{5}\cdot\frac{6}{6}\cdot\frac{\sin 6x}{x}$$

$$= \frac{6}{5}\lim_{x\to 0} \frac{\sin 6x}{6x}$$

$$= \frac{6}{5}\cdot 1$$

$$= \boxed{\frac{6}{5}}$$

Practice #2

$$\lim_{x\to 0} \frac{\sin 6x}{\cos 6x} = \frac{\sin 0}{\cos 0} = \frac{0}{1} = \boxed{0}$$

Practice #3

$$\lim_{x\to 0} \left(\frac{\cos x - 1}{2x}\right) = \lim_{x\to 0} \frac{-1(-\cos x + 1)}{2x}$$

$$= \lim_{x\to 0} \frac{-1}{2}\cdot\frac{1-\cos x}{x}$$

$$= -\frac{1}{2}\lim_{x\to 0} \frac{1-\cos x}{x}$$

$$= -\frac{1}{2}\cdot 0$$

$$= \boxed{0}$$