60 (133)

$$\lim_{h\to 0} \frac{\operatorname{tg}(x+h)-\operatorname{tg}x}{h} = \lim_{h\to 0} \frac{\frac{\sin(x+h)}{\cos(x+h)} - \frac{\sin x}{\cos x}}{h} = \lim_{h\to 0} \frac{\sin(x+h)\cos x - \sin x\cos(x+h)}{h\cos(x+h)\cos x}$$

$$\lim_{h\to 0} \frac{\sin(x+h-x)}{h\cos(x+h)\cos x} = \lim_{h\to 0} \frac{\sin h}{h} \cdot \frac{1}{\cos(x+h)\cos x} = \frac{1}{\cos x \cdot \cos x} = \frac{1}{\cos^2 x}$$