

5⁴ 4.4 #16

$$\lim_{x \rightarrow \infty} \frac{x+2}{\sqrt{9x^2+1}} = \lim_{x \rightarrow \infty} \frac{x+2}{\sqrt{9x^2(1+\frac{1}{9x^2})}}$$

$$= \lim_{x \rightarrow \infty} \frac{x+2}{3|x|\sqrt{1+\frac{1}{9x^2}}} = \lim_{x \rightarrow \infty} \frac{x+2}{3x\sqrt{1+\frac{1}{9x^2}}}$$

($x > 0$ when $x \rightarrow +\infty$)

$$= \lim_{x \rightarrow \infty} \frac{x(1+\frac{2}{x})}{3x\sqrt{1+\frac{1}{9x^2}}} = \lim_{x \rightarrow \infty} \frac{1+\frac{2}{x}}{3\sqrt{1+\frac{1}{9x^2}}} = \frac{1+0}{3\sqrt{1+0}}$$

$$= \frac{1}{3\sqrt{1}} = \frac{1}{3}$$