Problem 11: Find $\lim_{x\to\infty} \frac{x}{x}$

(Source: AoPS Calculus)

Proof. Let $\epsilon > 0$. We want to find an N such that

$$x > N \quad \Longrightarrow \quad \left|\frac{x}{x} - 1\right| < \epsilon$$

Let $N = 0$. Then

$$x > N \quad \Longrightarrow \quad \frac{x}{x} = 1 \quad \Longrightarrow \quad \left|\frac{x}{x} - 1\right| = 0$$

Thus

$$\lim_{x\to\infty} \frac{x}{x} = 1$$

□