Example 1. Compute

$$\lim_{x \to 3} \frac{x^2 + 6x - 5}{x - 3}.$$

Explanation. Note that when $x \neq 3$, we may write:

$$\frac{x^2 + 6x - 5}{x - 3} = \frac{(x - 3)(x + 9)}{x - 3} = x + 9.$$

Since the definition of a limit assumes (continuity / continuity ✓/ continuity) when $x \neq 3$, the limit exists:

$$\lim_{x \to 3} \frac{x^2 + 6x - 5}{x - 3} = \lim_{x \to 3} x + 9 = 12.$$