

WHEN LIMITS FAIL ... 3 WAYS

The $\lim_{x \rightarrow c} f(x)$ does not exist when there is no number satisfying the definition.

1. $f(x)$ approaches a different numbers from the right and left.

$$\text{Example: } \lim_{x \rightarrow 0} \frac{|x|}{x}$$

2. $f(x)$ increases or decreases without bound as x approaches c .

$$\text{Example: } \lim_{x \rightarrow 1} \frac{1}{(x-1)^2}$$

3. $f(x)$ oscillates between two fixed values as x approaches c .

$$\text{Example: } \lim_{x \rightarrow 0} \sin\left(\frac{1}{x}\right)$$