

## Summary: Limits of Quotients

### Limit Law for Division

If  $\lim_{x \rightarrow a} f(x) = L$  and  $\lim_{x \rightarrow a} g(x) = M$ , then:

- If  $M \neq 0$ , then  $\lim_{x \rightarrow a} \frac{f(x)}{g(x)} = \frac{L}{M}$ .
- If  $M = 0$  but  $L \neq 0$ , then  $\lim_{x \rightarrow a} \frac{f(x)}{g(x)}$  does not exist.
- If both  $M = 0$  and  $L = 0$ , then  $\lim_{x \rightarrow a} \frac{f(x)}{g(x)}$  might exist, or it might not exist. More work is necessary to determine whether the last type of limit exists, and what it is if it does exist.