

THE LIMIT LAWS

1. $\lim_{x \rightarrow a} (f(x) + g(x)) = \lim_{x \rightarrow a} f(x) + \lim_{x \rightarrow a} g(x)$

2. $\lim_{x \rightarrow a} (f(x) - g(x)) = \lim_{x \rightarrow a} f(x) - \lim_{x \rightarrow a} g(x)$

3. $\lim_{x \rightarrow a} (f(x)g(x)) = \lim_{x \rightarrow a} f(x) \cdot \lim_{x \rightarrow a} g(x)$

4. $\lim_{x \rightarrow a} (cf(x)) = c \lim_{x \rightarrow a} f(x)$

5. $\lim_{x \rightarrow a} \frac{f(x)}{g(x)} = \frac{\lim_{x \rightarrow a} f(x)}{\lim_{x \rightarrow a} g(x)}$ if $\lim_{x \rightarrow a} g(x) \neq 0$

6. $\lim_{x \rightarrow a} (f(x))^n = \left(\lim_{x \rightarrow a} f(x) \right)^n$

7. $\lim_{x \rightarrow a} c = c$

8. $\lim_{x \rightarrow a} x = a$

9. $\lim_{x \rightarrow a} x^n = a^n$

10. $\lim_{x \rightarrow a} \sqrt[n]{x} = \sqrt[n]{a}$
where n is a positive integer

11. $\lim_{x \rightarrow a} \sqrt[n]{f(x)} = \sqrt[n]{\lim_{x \rightarrow a} f(x)}$
where n is a positive integer

12. **(Direct Substitution Property)** **If** f is a polynomial or a rational function **and** a is in the domain of f , **then** $\lim_{x \rightarrow a} f(x) = f(a)$

13. **If** $f(x) \leq g(x)$ when x is near a , **then** $\lim_{x \rightarrow a} f(x) \leq \lim_{x \rightarrow a} g(x)$

14. **(The Squeeze Theorem)** **If** $f(x) \leq g(x) \leq h(x)$ when x is near a **and** $\lim_{x \rightarrow a} f(x) = \lim_{x \rightarrow a} h(x) = L$, **then** $\lim_{x \rightarrow a} g(x) = L$ as well