$$\lim_{x \to a} f(x) = L$$

if for every number $\epsilon > 0$ there is a corresponding number $\delta > 0$ such that

$$\text{if} \quad 0 < |x - a| < \delta \quad \text{then} \quad |f(x) - L| < \epsilon\,.$$

The following are proposed properties of limits. For each one:

- if it is true, mark it TRUE;
- if it is almost true, correct it to make it true; or
- if it terribly wrong, mark it FALSE!

Assume that the limits $\lim_{x \to a} f(x) = F$, $\lim_{x \to a} g(x) = G$, and $\lim_{x \to a} h(x) = H$ exist.

1. $\lim_{x \to a} (7f(x)) = 7F$

2. $\lim_{x \to a} 5 = 5$

3. $\lim_{x \to a} x = a$

4. $\lim_{x \to 0} f(x - a) = F$

5. $\lim_{x \to 1} f(xa) = F$

6. $\lim_{x \to 0} f(x) = 0$

7. $\lim_{y \to a} f(y) = F$

8. $\lim_{x \to a^-} f(x) = F$

9. $\lim_{x \to a} |f(x)| = |F|$

10. $f(x) > 5 \quad \Rightarrow \quad F > 5$

11. $f(x) < g(x) \quad \Rightarrow \quad F < G$

12. $f(x) < g(x) < h(x) \quad \text{and} \quad F = H \Rightarrow G = F$

13. $\lim_{x \to a} (f(x) + g(x)) = F + G$

14. $\lim_{x \to a} (f(x) - g(x)) = F - G$

15. $\lim_{x \to a} (f(x)g(x)) = FG$

16. $\lim_{x \to a} \left(\frac{1}{g(x)} \right) = \frac{1}{G}$

17. $\lim_{x \to a} \left(\frac{f(x)}{g(x)} \right) = \frac{F}{G}$

18. $\lim_{x \to a} x^n = a^n$

19. $\lim_{x \to a} (f(x))^n = F^n$

20. $\lim_{x \to a} \sqrt[n]{x} = \sqrt[n]{a}$

21. $\lim_{x \to a} \sqrt[n]{f(x)} = \sqrt[n]{F}$

22. $\lim_{x \to a} (f(x) + g(x))^n = F^n + G^n$