Math 1A: True/False quick quiz

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Decide whether each of the following statements is TRUE or FALSE. These exercises are from the Chapter 2 review in *Single Variable Calculus: Early Transcendentals for UC Berkeley* by James Stewart.

1. $\lim_{x\to 4}\left(\dfrac{2x}{x-4}-\dfrac{8}{x-4}\right)=\lim_{x\to 4}\dfrac{2x}{x-4}-\lim_{x\to 4}\dfrac{8}{x-4}$
2. $\lim_{x\to 1}\dfrac{x-3}{x^2+2x-4}=\dfrac{\lim_{x\to 1}(x-3)}{\lim_{x\to 1}\left(x^2+2x-4\right)}$
3. If $\lim_{x\to 5} f(x)=2$ and $\lim_{x\to 5} g(x)=0$, then $\lim_{x\to 5}\big[f(x)/g(x)\big]$ does not exist.
4. If $\lim_{x\to 5} f(x)=0$ and $\lim_{x\to 5} g(x)=0$, then $\lim_{x\to 5}\big[f(x)/g(x)\big]$ does not exist.
5. If $\lim_{x\to 6}\big[f(x)\,g(x)\big]$ exists, then the limit must be $f(6)\,g(6)$.
6. If $\lim_{x\to 0} f(x)=\infty$ and $\lim_{x\to 0} g(x)=\infty$, then $\lim_{x\to 0}\big[f(x)-g(x)\big]=0$.
7. If p is a polynomial, then $\lim_{x\to b} p(x)=p(b)$.
8. A function can have two different horizontal asymptotes.
9. If f has domain $[0,\infty)$ and has no horizontal asymptote, then $\lim_{x\to\infty} f(x)=\infty$ or $-\infty$.
10. If the line $x=1$ is a vertical asymptote of $y=f(x)$, then f is not defines at 1.
11. If $f(1)>0$ and $f(3)<0$, then there exists a number c between 1 and 3 such that $f(c)=0$.
12. If f is continuous at 5 and $f(5)=2$ and $f(4)=3$, then $\lim_{x\to 2} f(4x^2-11)=2$.
13. If f is continuous on $[-1,1]$ and $f(-1)=4$ and $f(1)=3$, then there exists a number r such that $|r|<1$ and $f(r)=\pi$.
14. Let f be a function such that $\lim_{x\to 0} f(x)=6$. Then there exists a number δ such that if $0<|x|<\delta$, then $|f(x)-6|<1$.
15. If $f(x)>1$ for all x and $\lim_{x\to 0} f(x)$ exists, then $\lim_{x\to 0} f(x)>1$.
16. If f is continuous at a, then f is differentiable at a.
17. If $f'(r)$ exists, then $\lim_{x\to r} f(x)=f(r)$.
18. $\dfrac{d^2y}{dx^2}=\left(\dfrac{dy}{dx}\right)^2$