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 5 review in *Single Variable Calculus: Early Transcendentals for UC Berkeley* by James Stewart.

1. If f and g are continuous on $[a, b]$, then $\int_a^b [f(x) + g(x)]\,dx = \int_a^b f(x)\,dx + \int_a^b g(x)\,dx$.

2. If f and g are continuous on $[a, b]$, then $\int_a^b [f(x)g(x)]\,dx = \left(\int_a^b f(x)\,dx\right)\left(\int_a^b g(x)\,dx\right)$.

3. If f is continuous on $[a, b]$, then $\int_a^b 5f(x)\,dx = 5\int_a^b f(x)\,dx$.

4. If f is continuous on $[a, b]$, then $\int_a^b x f(x)\,dx = x\int_a^b f(x)\,dx$.

5. If f is continuous on $[a, b]$ and $f(x) \geq 0$, then $\int_a^b \sqrt{f(x)}\,dx = \sqrt{\int_a^b f(x)\,dx}$.

6. If f' is continuous on $[1, b3]$, then $\int_1^3 f'(v)\,dv = f(3) - f(1)$.

7. If f and g are continuous and $f(x) \geq g(x)$ for $a \leq x \leq b$, then $\int_a^b f(x)\,dx \geq \int_a^b g(x)\,dx$.

8. If f and g are differentiable and $f(x) \geq g(x)$ for $a < x < b$, then $f'(x) \geq g'(x)$ for $a < x < b$.

9. $\int_{-1}^1 \left(x^5 - 6x^9 + \dfrac{\sin x}{(1 + x^4)^2}\right) dx = 0$

10. $\int_{-5}^5 \left(ax^2 + bx + c\right) dx = 2\int_0^5 \left(ax^2 + c\right) dx$

11. $\int_{-2}^1 \dfrac{1}{x^4}\,dx = -\dfrac{3}{8}$

12. $\int_0^2 (x - x^3)\,dx$ represents the area under the curve $y = x - x^3$ from 0 to 2.

13. All continuous functions have derivatives.

14. All continuous functions have antiderivatives.

15. If f if continuous on $[a, b]$, then $\dfrac{d}{dx}\left(\int_a^b f(x)\,dx\right) = f(x)$.