**DERIVATIVE RULES**

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|---|---|---|
| 1. | $f(x) = k$; (k is a constant) | $f'(x) = 0$ |
| 2. | $f(x) = x^n$ | $f'(x) = nx^{n-1}$ |
| 3. | $f(x) = k(g(x))$ | $f'(x) = k * g'(x)$ |
| 4. | $f(x) = g(x) + h(x)$ | $f'(x) = g'(x) + h'(x)$ |
| 5. | $f(x) = g(x) * h(x)$ | $f'(x) = g'(x) * h(x) + h'(x) * g(x)$ |
| 6. | $f(x) = \frac{g(x)}{h(x)}$ | $f'(x) = \frac{g'(x) * h(x) - h'(x) * g(x)}{[h(x)]^2}$ |
| 7. | $f(x) = g(h(x))$ | $f'(x) = g'(h(x)) * h'(x)$ |
| 8. | $f(x) = g(x)^n$ | $f'(x) = n(g(x))^{n-1} * g'(x)$ |
| 9. | $f(x) = \ln x$ | $f'(x) = 1/x$ |
| 10. | $f(x) = \ln^n g(x)$ or $(\ln g(x))^n$ | $f'(x) = n(\ln g(x))^{n-1} * 1/(g(x)) * g'(x)$ |
| 11. | $f(x) = e^x$ | $f'(x) = e^x$ |
| 12. | $f(x) = a^x$; (a is a constant) | $f'(x) = a^x * \ln a$ |
| 13. | $f(x) = \log_a x$ | $f'(x) = \frac{1}{x \ln a}$ |
| 14. | $f(x) = \log_a g(x)$ | $f'(x) = \frac{1}{g(x) * \ln a} * g'(x)$ |
| 15. | $f(x) = \sin x$ | $f'(x) = \cos x$ |
| 16. | $f(x) = \sin^n x$ or $(\sin x)^n$ | $f'(x) = n(\sin x)^{n-1} * \cos x$ |
| 17. | $f(x) = \sin^n(g(x))$ | $f'(x) = n(\sin(g(x)))^{n-1} * \cos(g(x)) * g'(x)$ |
| 18. | $f(x) = \cos x$ | $f'(x) = -\sin x$ |
| 19. | $f(x) = \tan x$ | $f'(x) = \sec^2 x$ |
| | | $f'(x) = \tan^2 x + 1$ |
| 20. | $f(x) = \tan g(x)$ | $f'(x) = \sec^2 g(x) * g'(x)$ |
| 21. | $f(x) = \tan^n x$ or $(\tan x)^n$ | $f'(x) = n(\tan x)^{n-1} * \sec^2 x$ |

22. $f(x) = \tan^n(g(x)$ $f'(x) = n(\tan g(x))^{n-1} * \sec^2(g(x))*g'(x)$

23. $f(x) = \csc x$ $f'(x) = -\csc x * \cot x$

$f'(x) = -\cos x / \sin^2 x$

24. $f(x) = \sec x$ $f'(x) = \tan x * \sec x$

$f'(x) = \sin x / \cos^2 x$

25. $f(x) = \cot x$ $f'(x) = -\cot^2 x - 1$

$f'(x) = -\csc^2 x$