
Computing Derivatives

Name: _____

Section No: _____

Compute the derivative of the functions below using differentiation rules up through Section 3.3 (power rule, sum rule, product rule, quotient rule). Simplify final answers when requested. Parameters a , b , and n are constants.

Remark. Although the derivatives of $1/x = x^{-1}$ and $\sqrt{x} = x^{1/2}$ are special instances of the power rule, they come up often enough that they're worth committing to memory so you know them immediately when needed: $\frac{d}{dx} \left(\frac{1}{x} \right) = -\frac{1}{x^2}$ and $\frac{d}{dx} \sqrt{x} = \frac{1}{2\sqrt{x}}$.

1. $f(x) = 7x^3 - 5x + 8$
2. $f(x) = \frac{1}{x} + \frac{1}{1-x}$ (in final answer, use common denominator and simplify numerator)
3. $f(x) = \frac{ax}{x+b}$ (simplify final answer)
4. $f(x) = \frac{e^x}{1+e^x}$ (simplify numerator in final answer)
5. $f(x) = \frac{\sin x}{1+\sin x}$ (simplify numerator in final answer)
6. $f(x) = \frac{1+\sin x}{1+\cos x}$ (simplify numerator)
7. $f(x) = \frac{e^x}{x^n}$ (simplify final answer)
8. $f(x) = a \sin x + b \cos x$
9. $f(x) = \sin x \cos x$
10. $f(x) = e^x \cos x$
11. $f(x) = x^n e^x$ (factor out common terms in final answer)
12. $f(x) = x^n \cos x$ (factor out common terms in final answer)
13. $f(x) = \sqrt{x} \sin x$ (give final answer a common denominator)
14. $f(x) = \frac{\tan x}{x^2 + 1}$