

Math 1a. §3.2 Worksheet

The Product and Quotient Rules

Fall 2005

Differentiation Rules

- $\frac{d}{dx}c = 0$
- $\frac{d}{dx}x^n = nx^{n-1}$
- $\frac{d}{dx}e^x = e^x$
- $(cf)' = cf'$
- $(f + g)' = f' + g'$
- $(f - g)' = f' - g'$
- $(fg)' = fg' + f'g$
- $\left(\frac{f}{g}\right)' = \frac{f'g - fg'}{g^2}$

Exercises

1. Evaluate the derivative of each of the following functions.

(a) $y = xe^{10x}$

(b) $f(t) = e^t + e^2 + t^e$

(c) $x(t) = \frac{t^3 - 2t + 4}{e^{3t} + 2}$

(d) $y = \frac{e^x - e^{-x}}{2}$

(e) $f(x) = (x^2 - 2x + 5)e^x$

(f) $x(t) = \frac{t^3 - 2t + 4}{t^3 - t + 2}$

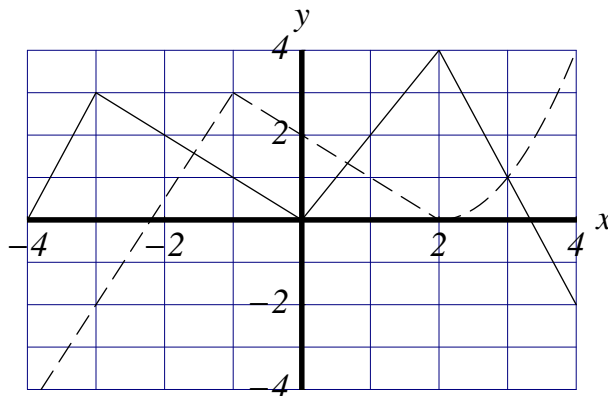
(g) $(x^2 - 7x + 4)(x^3 - x + 3)$

(h) $y = \frac{\sqrt{x}}{x^2 - x + 5}$

(i) $f(x) = e^x(x^2 + 1)g(x)$, where g is some differentiable function.

(j) $f(x) = (x^5 - 3x^2 - 4)\sqrt{x}$

2. Let f and g be the functions whose graphs are shown below and $u(x) = f(x)g(x)$ and $v(x) = f(x)/g(x)$



(a) Find $u'(1)$.

(b) Find $v'(1)$.