Section 3.3 & 3.4: Product, Quotient, & Chain Rule

Find the derivative of each function

Product Rule

(a) $h(x) = (x^2 + 5)(3x - 14x)$

(b) $h(x) = (3x^5 - 7x^2)e^x$

(c) $h(x) = (e^x + 1)\ln(x)$

Quotient Rule

(a) $h(x) = \dfrac{4x^2 - 1}{6x + 6}$

(b) $h(x) = \dfrac{1 + e^x}{1 - e^x}$

(c) $h(x) = \dfrac{5\ln(x) + x^7}{x^2 - 1}$

Chain Rule

(a) $h(x) = (x^3 + 2x + 12)^8$

(b) $h(x) = \sqrt[4]{x^2 - 5x + 6}$

(c) $h(x) = e^{-x^2}$

(d) $h(x) = \ln(x^3 - 3)$

??? Rule(s)

(a) $h(x) = (x^4 + e^x)\ln(x)$

(b) $h(x) = \dfrac{e^{18x}}{x}$

(c) $h(x) = (5x + 5)^{55}$

(d) $h(x) = \dfrac{1}{\ln x} - \dfrac{1}{e^x}$

(e) $h(x) = \ln\left(\dfrac{x^2}{e^x}\right)$

Hint (d): Don't <u>have</u> to use quotient rule. Instead start by using $1/a = a^{-1}$.

Hint (e): Don't <u>have</u> to use quotient rule. Instead start by using $\ln(a/b) = \ln a - \ln b$.