

OPMT 5701
Homework #5-Key
More challenging Chain Rule problems

Answers to Homework Problems

Exercise 1 find y' if

$$y = [(x^2 + x)(2x^3 - 4)]^3$$
$$y' = 3 [(x^2 + x)(2x^3 - 4)]^2 \cdot [(2x + 1)(2x^3 - 4) + (x^2 + x)(6x^2)]$$

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Exercise 2 find y' if

$$y = [(x^{1/3} + 2)(5x^{1/5} + 7)]^2$$
$$y' = 2 [(x^{1/3} + 2)(5x^{1/5} + 7)] \cdot \left[\left(\frac{1}{3}x^{-2/3}\right)(5x^{1/5} + 7) + (x^{1/3} + 2)(x^{-4/5}) \right]$$

Exercise 3 find y' if

$$y = [(2x^7 + 3x)(\frac{1}{2}x^2 + 4)]^{1/2}$$
$$y' = \frac{1}{2} [(2x^7 + 3x)(\frac{1}{2}x^2 + 4)]^{-1/2} \cdot [(14x^6 + 3)(\frac{1}{2}x^2 + 4) + (2x^7 + 3x)x]$$

Exercise 4 find y' if

$$y = \left[\frac{(3x^2 + 3)}{(x^3 - 4)} \right]^2$$

first apply quotient rule to inside

$$g = \frac{(3x^2 + 3)}{(x^3 - 4)}$$
$$g' = \frac{-3x(x^3 + 3x + 8)}{(x^3 - 4)^2}$$

then use chain rule

$$y' = 2 \left[\frac{(3x^2 + 3)}{(x^3 - 4)} \right] \cdot \left(\frac{-3x(x^3 + 3x + 8)}{(x^3 - 4)^2} \right)$$

Exercise 5 find y' if

$$y = (2x^3 + 1)^2(x - 1)^{1/2}$$

this is tricky! (hint: product, then chain)

$$y' = \frac{1}{2\sqrt{x-1}} (52x^6 - 48x^5 + 28x^3 - 24x^2 + 1)$$

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