The Chain Rule

Success Criteria: I can solve problems, using the chain rule.

We had yesterday that $\frac{dy}{dx} = \frac{dy}{du}\frac{du}{dx}$

Ex $y = \left(\frac{6x+3}{4x-5}\right)^5$

$y' = 5\left(\frac{6x+3}{4x-5}\right)^4 \cdot \left(\frac{6x+3}{4x-5}\right)'$

$y' = 5\left(\frac{6x+3}{4x-5}\right)^4 \left[\frac{(4x-5)6-(6x+3)4}{(4x-5)^2}\right]$

$y' = 5\frac{(6x+3)^4}{(4x-5)^4} \cdot \frac{(-42)}{(4x-5)^2}$

$y' = \frac{-210(6x+3)^4}{(4x-5)^6}$

Ex. $y = (2x+1)^3 (5x-1)^4$

$$y' = (2x+1)^3\left[(5x-1)^4\right]' + (5x-1)^4\left[(2x+1)^3\right]'$$

$$y' = (2x+1)^3 \cdot 4(5x-1)^3 \cdot (5x-1)' + (5x-1)^4 \cdot 3(2x+1)^2 (2x+1)'$$

$$y' = (2x+1)^3 \cdot 4(5x-1)^3 \cdot 5 + (5x-1)^4 \cdot 3(2x+1)^2 \cdot 2$$

common factor

$$y' = 2(2x+1)^2(5x-1)^3\left[10(2x+1) + 3(5x-1)\right]$$

$$y' = 2(2x+1)^2(5x-1)^3(35x+7)$$

common factor

$$y' = 14(2x+1)^2(5x-1)^3(5x+1)$$

Homework Page 106 #8, 10, 17 and 19