"Chain Rule Practice" handout

#1d)

$$y = \sqrt{x^2+3} \cdot \sqrt[3]{x^3-1}$$

$$y' = (\sqrt{x^2+3})' \cdot \sqrt[3]{x^3-1} + \sqrt{x^2+3} \cdot (\sqrt[3]{x^3-1})'$$

$$y' = \frac{1\,(2x)}{2\sqrt{x^2+3}} \cdot \sqrt[3]{x^3-1} + \sqrt{x^3+3} \cdot \frac{1}{3}(x^3-1)^{-\frac{2}{3}} \cdot 3x^2$$

$$y' = x(x^2+3)^{-\frac{1}{2}}(x^3-1)^{\frac{1}{3}} + x^2(x^2+3)^{\frac{1}{2}} \cdot (x^3-1)^{-\frac{2}{3}}$$

$$y' = x(x^2+3)^{-\frac{1}{2}}(x^3-1)^{-\frac{2}{3}}\left[\, x^3-1 + x(x^2+3)\,\right]$$

$$y' = x(x^2+3)^{-\frac{1}{2}}(x^3-1)^{-\frac{2}{3}}\left[\, x^3-1+x^3+3x\,\right]$$

$$y' = \frac{x(2x^3+3x-1)}{\sqrt{x^2+3}\,\sqrt[3]{(x^3-1)^2}}$$