Calculus I
Derivatives of arbitrary radicals, part 2

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$$\frac{\mathrm{d}}{\mathrm{d}x}[h(x)]^n = n[h(x)]^{n-1} \cdot h'(x)$$

$$(g(h(x)))' = g'(h(x)) \cdot h'(x) \qquad \text{(notation 1)}$$

$$(g(u))' = g'(u)u' \qquad \text{where } u = h(x) \qquad \text{(notation 2)}$$

$$\frac{\mathrm{d}y}{\mathrm{d}x} = \frac{\mathrm{d}y}{\mathrm{d}u}\frac{\mathrm{d}u}{\mathrm{d}x} \qquad \text{where } y = g(u) \qquad \text{(notation 3)} \quad .$$

Example (Chain Rule, Notation 1, Power Rule)

Differentiate $f(x) = \frac{1}{\sqrt[3]{x^2+x+1}}$.

Let $h(x)$

Let $g(u) =$

Chain Rule: $f'(x) = g'(h(x))h'(x)$

$= \left(\qquad\qquad\right)\left(\qquad\right)$