# Differentiation Rules: polynomials

Power Rule for integers

$$\frac{d}{dx}x \rightarrow 1 \qquad \frac{d}{dx}\frac{1}{x} \rightarrow -\frac{1}{x^2}$$

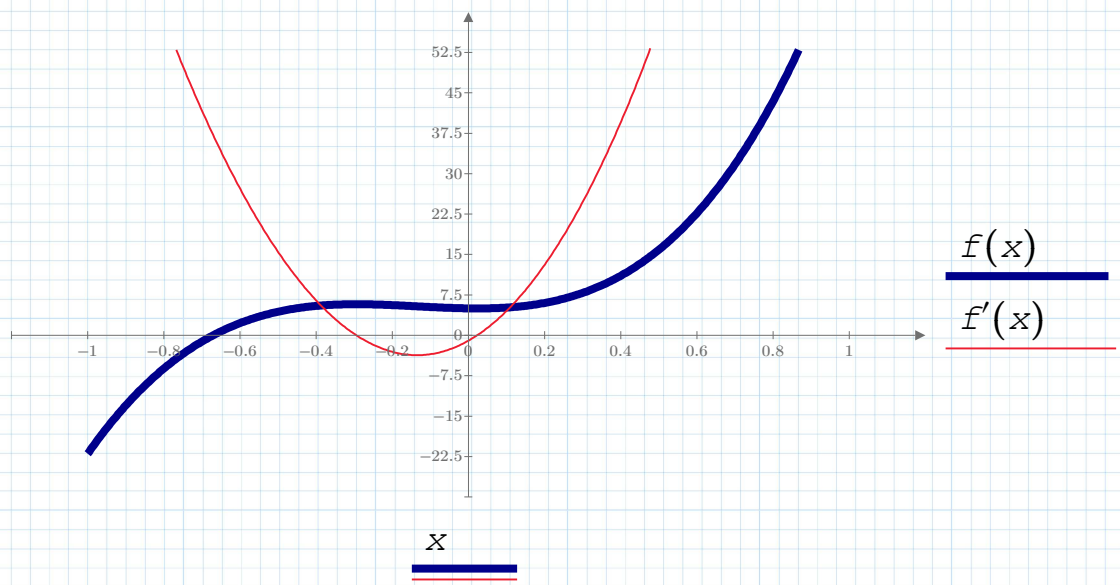
$$\frac{d}{dx}x^3 \rightarrow 3\cdot x^2 \qquad \frac{d}{dx}\frac{1}{x^3} \rightarrow -\frac{3}{x^4}$$

$$\frac{d}{dx}x^2 \rightarrow 2\cdot x \qquad \frac{d}{dx}\frac{1}{x^2} \rightarrow -\frac{2}{x^3}$$

$$\frac{d}{dx}x^n \rightarrow n\cdot x^{n-1}$$

$$f(x) := 2\ x^4 + 50\ x^3 + 20\ x^2 - x + 5$$

$$f'(x) \rightarrow 8\cdot x^3 + 150\cdot x^2 + 40\cdot x - 1$$




$$f'(0.2) \rightarrow 13.064$$

$$f'(0.2) = 13.064$$

References:


1. **G.Simmons.** Calculus With Analitic Geometry (1996): 3.1
2. **MIT** lection 14.02.2013