25-01-2025 STEP Practice: Chain Rule

Let $y = f(u)$, $u = g(x)$. Then:

$$\frac{dy}{dx} = \frac{dy}{du} \cdot \frac{du}{dx} \quad \text{or} \quad y' = f'(g(x))g(x)$$

1) $\frac{d}{dx}[3x+2]^4 = 12[3x+2]^3$

2) $\frac{d}{dx}[2x-3]^5 = 10[2x-3]^4$

3) $\frac{d}{dx}[1-4x]^7 = -28[1-4x]^6$

4) $\frac{d}{dx}[2+9x]^5 = 45[2+9x]^4$

5) $\frac{d}{dx}[3+x^2]^5 = 10x[3+x^2]^4$

6) $\frac{d}{dx}[1-x^3]^8 = -24x^2[1-x^3]^7$

7) $\frac{d}{dx}[2x+1]^6 = 12[2x+1]^5$

8) $\frac{d}{dx}[x^2+5]^{10} = 20x[x^2+5]^9$

9) $\frac{d}{dx}[1+3x]^{-3} = -9[1+3x]^{-4}$

10) $\frac{d}{dx}[1-4x^2]^{-1} = 8x[1-4x^2]^{-2}$

11) $\frac{d}{dx}[5x-3]^{\frac{1}{2}} = \frac{5}{2}[5x-3]^{-\frac{1}{2}}$

12) $\frac{d}{dx}[x^2+1]^{-\frac{3}{2}} = -5x[x^2+1]^{-\frac{5}{2}}$