

Calculus Worksheet: Derivatives of Composite Functions (1)

If $y = f(x^2)$ and $f'(x) = \sqrt{5x-3}$, find $\frac{dy}{dx}$.

$$\text{let } u = x^2 \Rightarrow y = f(u).$$

$$\text{Use chain rule : } \frac{dy}{dx} = \frac{df}{du} \cdot \frac{du}{dx}$$

$$\frac{df}{du} = \sqrt{5u-3} \quad \frac{du}{dx} = 2x$$

$$\Rightarrow \frac{dy}{dx} = \sqrt{5u-3} \cdot 2x$$

$$\frac{dy}{dx} = \underline{2x\sqrt{5x^2-3}}$$