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Quiz 14

Find the derivatives of the functions below:

$$\begin{aligned}y &= \sin(\cos x) \\y &= (2x^4 + 3x^3 + x^2 - 1)^4 \\(x^2 + y^2)^2 &= 25(x^2 + y^2) \\x \cos x^2 &= y \sin^2 y\end{aligned}$$

Solution

1:

$$y' = -\cos(\cos x) \sin x$$

2:

$$y' = 4(2x^4 + 3x^3 + x^2 - 1)^3(8x^3 + 9x^2 + 2x)$$

3:

$$2(x^2 + y^2)(2x + 2yy') = 25(2x + 2yy')$$

solving for y' :

$$y' = -\frac{25x - 2x(x^2 + y^2)}{25y - 2y(x^2 + y^2)}$$

4:

$$\begin{aligned}\cos x^2 - 2x^2 \sin x^2 &= y' \sin^2 y + y(2 \sin y)(\cos y)y' \\y' &= \frac{\cos x^2 - 2x^2 \sin x^2}{\sin^2 y + y(2 \sin y)(\cos y)}\end{aligned}$$