

CHAIN RULE LECTURE PROBLEMS

Calculate $\frac{dy}{dx}$

1. $y = \cos(7x)$

Sol: $\frac{dy}{dx} = -\sin(7x) \cdot 7 = -7\sin(7x)$ \square

2. $y = \cos^2(x) = (\cos(x))^2$

Sol: $\frac{dy}{dx} = 2\cos(x)(-\sin(x)) = -2\sin(x)\cos(x)$ \square

3. $y = \frac{\cos(8x^2)}{\sin(4x)+1}$

Sol: $\frac{dy}{dx} = \frac{(\sin(4x)+1)\frac{d}{dx}[\cos(8x^2)] - \cos(8x^2)\frac{d}{dx}[\sin(4x)+1]}{(\sin(4x)+1)^2}$
 $= \frac{(\sin(4x)+1)(-\sin(8x^2) \cdot 16x) - \cos(8x^2) \cdot \cos(4x) \cdot 4}{(\sin(4x)+1)^2}$ \square

4. $y = (x^5 - 9x^2 + 7)^{1000}$

Sol: $\frac{dy}{dx} = 1000(x^5 - 9x^2 + 7)^{999}(5x^4 - 18x)$ \square