

1. For each of the following functions, calculate its derivative. *If you finish early, come back and find the second derivatives!*

$$f(x) = e^{x^2+3x-1}$$

$$g(x) = \sqrt{5x^2 - 1}$$

$$h(x) = \sin^3(4x)$$

$$j(x) = \tan(xe^{\sin x})$$

2. For each of the following functions, calculate its derivative.

$$5^x$$

$$\sec(\pi^x)$$

3. Recall to convert between degrees into radians, we multiply by the factor $\frac{\pi}{180}$. For example, 90° is $\frac{\pi}{180}90 = \frac{\pi}{2}$.

If we worked in degrees, instead of radians, what would be the derivative $\frac{d}{dx} \sin(x)$?

Note 0 degrees is 0 radians. Calculate and compare $\frac{d}{dx} \sin(x)$ for x in radians and degrees when $x = 0$. Why are they different? *Hint: Think about the graphs and tangent lines.*