

Lecture 10 Activity: Chain Rule

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1. Use the chain rule (and other rules) to calculate derivatives of the following functions.
 - 1.1 $e^{\cos x}$
 - 1.2 e^{cx}
 - 1.3 $\sin(cx)$
 - 1.4 $\sin(e^x)$
 - 1.5 $(\sin(x))^{1000}$
 - 1.6 $\frac{\sin(\cos x)}{x^2}$
2. Take the derivatives of the functions below. Which ones require the chain rule?
 - 2.1 $\frac{x^2-3x+1}{e^{(x^2)}}$
 - 2.2 $\sin\left(\frac{1}{x}\right)$
 - 2.3 $\frac{\sin^2 x - \cos^2 x}{x^2}$
3. What is the derivative of $\sin(\cos(e^x))$? (**Hint:** This will require using the chain rule twice. First, use the chain rule to differentiate $\cos(e^x)$; then look at the whole thing.)