Lecture 9 Activity: Trigonometric Derivatives, Chain Rule Preview

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1. Compute derivatives of the following functions.

   1.1 $\csc x = \frac{1}{\sin x}$

   1.2 $\sec x = \frac{1}{\cos x}$

   1.3 $\cot x = \frac{\cos x}{\sin x}$

   1.4 $e^x \sin x$

   1.5 $\frac{\sin x \cos x}{x^2 + 2x + 1}$

2. Let $f(x) = a \cos x + b \sin x$.

   2.1 Suppose that $f(0) = 3$ and $f(\pi/2) = -2$. What are a and b?

   2.2 Suppose that $f(0) = -1$ and $f'(\pi) = 4$. What are a and b?

   2.3 Suppose that $f''(\pi) = 0$ and $f'''(2\pi) = 3$. What are a and b?

3. For each of the functions below, determine whether or not you would use the chain rule to take the derivative of the function. If it is, what is u?

   3.1 $\sin(e^x)$

   3.2 $e^x \sin x$

   3.3 $\cos(1/x)$

   3.4 $\frac{1}{x^2}$

   3.5 $5x + e^{(x^2)}$

   3.6 $\sin \cos x$