

**Student handout** Suppose that  $x = s \cos \phi$  and  $y = s \sin \phi$ .

1. Let  $h(x, y) = xy$ . Determine  $\frac{\partial h}{\partial s}$  (with  $\phi$  held constant) and  $\frac{\partial h}{\partial \phi}$  (with  $s$  held constant).
2. Find at least one more way to compute these derivatives.  
*Make sure you get the same answer!*
3. Determine  $\frac{\partial s}{\partial x}$  and  $\frac{\partial \phi}{\partial x}$  (with  $y$  held constant).
4. Find at least one more way to compute these derivatives.  
*Make sure you get the same answer!*

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**Instructor's guide** If surfaces are available, Chain Rule Measurement is a possible alternative to this activity.