1. **Measurement**

   a) Using the measurement tool, find the rate of change in the surface in the x-direction at the **blue** dot on your surface. Include units.

   $$\frac{\partial f}{\partial x} =$$

   b) Using the measurement tool, find the rate of change in the surface in the y-direction at the **blue** dot on your surface. Include units.

   $$\frac{\partial f}{\partial y} =$$

   c) Using the measurement tool, find the rate of change in the surface in the s-direction at the **blue** dot on your surface. Include units.

   $$\frac{\partial f}{\partial s} =$$

2. **Computation**

   a) What are the *rectangular* coordinates of the blue dot (on the contour mat)?

   $$(x, y) =$$

   b) What are the *polar* coordinates of the blue dot (on the contour mat)?

   $$(s, \phi) =$$

   c) Use the chain rule to express $\frac{\partial f}{\partial s}$ in terms of $\frac{\partial f}{\partial x}$ and $\frac{\partial f}{\partial y}$.

   $$\frac{\partial f}{\partial s} =$$

3. **Comparison**

   - Compare your answers.