1. Let $x + 3y - z = 2$.
   - Write down $d\vec{\boldsymbol{r}}$ for the surface and use what you know to express it in two variables.
   - If one variable is constant, then write down $d\vec{\boldsymbol{r}}$ in that case. Label this vector $d\vec{\boldsymbol{r}}_1$.
   - Describe the vector you obtained above geometrically in relation to the surface.
   - If the other variable is constant, then write down $d\vec{\boldsymbol{r}}$ in that case. Label this vector $d\vec{\boldsymbol{r}}_2$.
   - Compute $d\vec{\boldsymbol{r}}_1 \times d\vec{\boldsymbol{r}}_2$. This is $d\vec{\boldsymbol{S}}$, the two-dimensional analogue of $d\vec{\boldsymbol{r}}$.
   - Is $d\vec{\boldsymbol{S}}$ tangent to the surface?
2. Consider the surface defined by $z = 3 - y^2$.
   - Sketch the surface and describe its normal vector both verbally and graphically.
   - Construct $d\vec{\boldsymbol{S}}$ as above.
   - Do you think $d\vec{\boldsymbol{S}}$ is normal to the surface?
3. Let M be the surface defined by $x^2 + y^2 = 3$ where $1 \leq z \leq 3$.
   - Sketch M. It includes the ends.
   - Construct $d\vec{\boldsymbol{S}}$ for M.
   - Include $d\vec{\boldsymbol{S}}$ in your sketch.