1.
- $z = x^4 + x^2 y$
- $x = s + 2t - u$
- $y = stu^2$
- $(s, t, u) = (4, 2, 1)$
- $\frac{\partial z}{\partial s} =$
  $4x^3 + 2xy\big|_{x(s,t,u),y(s,t,u)} + (x^2)\big|_{x(s,t,u),y(s,t,u)}\, tu^2 =$
  $4(s + 2t - u)^3 + 2(s + 2t - u)(stu^2) + (s + 2t - u)^2 tu^2$
- $\frac{\partial z}{\partial t} =$
  $2(\,4x^3 + 2xy\big|_{x(s,t,u),y(s,t,u)}) + \,(x^2)\big|_{x(s,t,u),y(s,t,u)}\, su^2 =$
  $2(4(s + 2t - u)^3 + 2(s + 2t - u)(stu^2)) + \,(s + 2t - u)^2 su^2$
- $\frac{\partial z}{\partial u} =$
  $-(\,4x^3 + 2xy\big|_{x(s,t,u),y(s,t,u)}) + \,(x^2)\big|_{x(s,t,u),y(s,t,u)}\, 2stu =$
  $-(4(s + 2t - u)^3 + 2(s + 2t - u)(stu^2)) + \,(s + 2t - u)^2 2stu$

2.
- $w = xy + yz + zx$
- $x = r\cos(\theta)$
- $y = r\sin(\theta)$
- $z = r\theta$
- $(r, \theta) = (2, \frac{\pi}{2})$
- $\frac{\partial w}{\partial r} =$
  $(y + z) \cdot \cos(\theta) + \,(x + z) \cdot \sin(\theta) + \,(x + y) \cdot \theta$
- $\frac{\partial w}{\partial \theta} =$
  $(y + z) \cdot -r\sin(\theta) + \,(x + z) \cdot r\cos(\theta) + \,(x + y) \cdot r$