

Problems: The Chain Rule with Constraints

Suppose $w = u^3 - uv^2$, $u = xy$ and $v = u + x$.

1. Find $\left(\frac{\partial w}{\partial u}\right)_x$ and $\left(\frac{\partial w}{\partial x}\right)_u$ using the chain rule.
2. Find $\left(\frac{\partial w}{\partial u}\right)_x$ and $\left(\frac{\partial w}{\partial x}\right)_u$ using differentials.

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