§15.5: Triple integrals
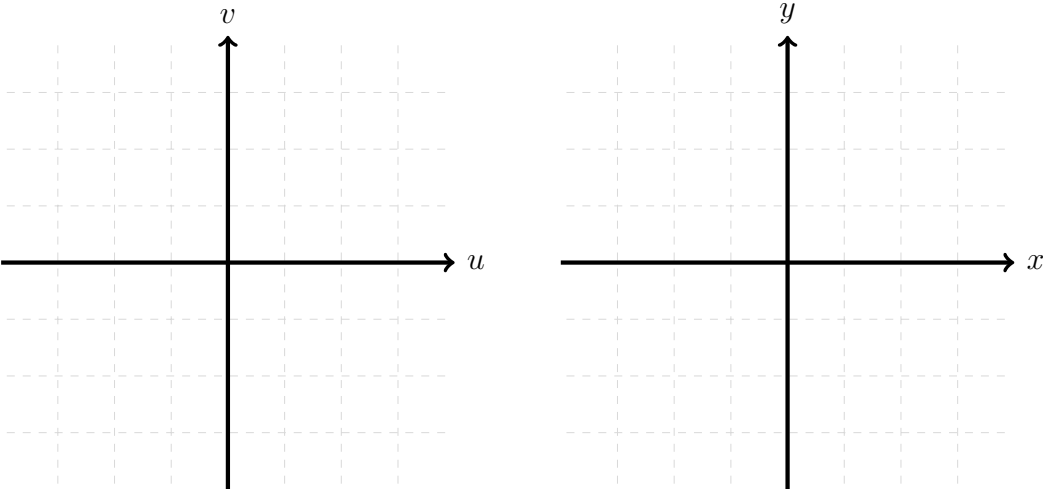
Let $u = x - y$ and $v = x + y$. Set up *but do* NOT *evaluate*

$$M = \iint_R x + y \, dA$$

where R is the region in the first quadrant bounded by the lines $x - y = 0$, $x - y = 1$, $x + y = 2$, $x + y = 3$. On the axes below, (a) sketch the new region of integration G after the change of variables and the original region R, (b) find the transformation $\mathbf{T}(u, v) = (x, y)$ and (c) compute the Jacobian determinant $|\det D\mathbf{T}(u, v)|$. Finally, (d) write the new iterated integral after the change of coordinates $\iint_G f(\mathbf{T}(u, v))|\det \mathbf{T}(u, v)| \, dA$.

A

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