

Find the Jacobian of the transformation.

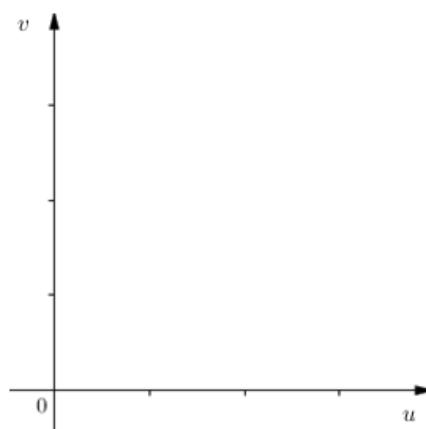
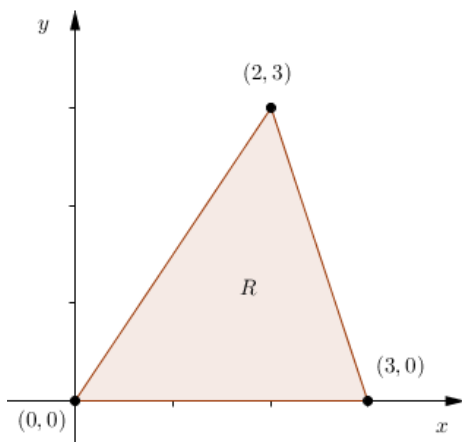
1) $x = u + 4v$, $y = 3u - 2v$

2) $x = e^u \sin v$, $y = e^u \cos v$

3) $x = uv$, $y = vw$, $z = uw$

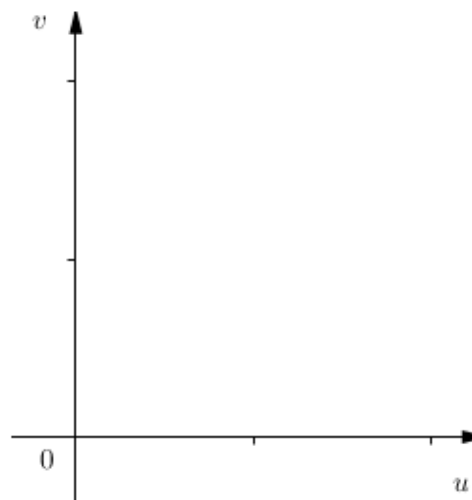
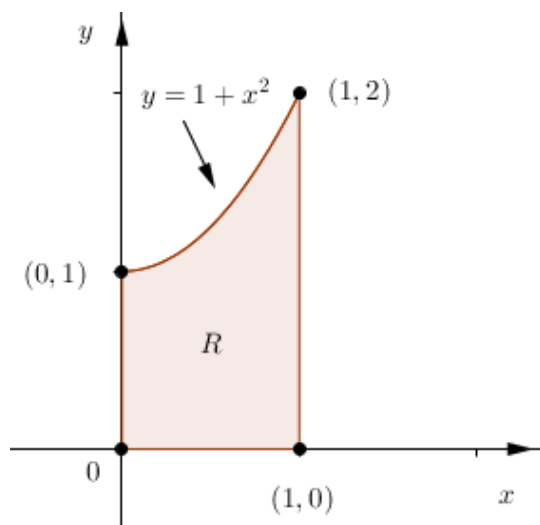
Sketch the image S in the uv -plane of the region R in the xy -plane using the given transformations.

4) $x = 3u + 2v$
 $y = 3v$



$$x = v$$

$$5) \quad y = u(1 + v^2)$$



Use the given transformation to evaluate the integral.

$$6) \quad \iint_R (4x + 8y) \, dA, \text{ where } R \text{ is the parallelogram with vertices } (-1, 3), (1, -3), (3, -1), \text{ and } (1, 5); \quad x = \frac{1}{4}(u + v),$$

$$y = \frac{1}{4}(v - 3u).$$

7) $\iint_R (x^2 - xy + y^2) dA$, where R is the region bounded by the ellipse $x^2 - xy + y^2 = 2$; $x = \sqrt{2}u - \sqrt{\frac{2}{3}}v$,
 $y = \sqrt{2}u + \sqrt{\frac{2}{3}}v$.

Evaluate the integral by making an appropriate change of variables.

8) $\iint_R \frac{x-2y}{3x-y} dA$, where R is the parallelogram enclosed by the lines $x-2y=0$, $x-2y=4$, $3x-y=1$, and
 $3x-y=8$.

9) $\iint_R (x+y)e^{x^2-y^2} dA$, where R is region enclosed by the rectangle with vertices: $\left(\frac{3}{2}, \frac{3}{2}\right)$, $\left(\frac{5}{2}, \frac{1}{2}\right)$, $(0,0)$, and $(1,-1)$.

10) $\iint_R \sqrt{x^2 + 3xy - 4y^2} dA$, where R is the region bounded by the parallelogram with vertices: $(0,0)$, $(1,1)$, $(5,0)$, and $(4,-1)$.