§26

Change of variable problems:

Find $\iint_R f(x,y)\,dxdy$ given $G(u,v) = (x(u,v), y(u,v))$ and R in the xy-plane.

Step 1:

Use $x = x(u,v)$ and $y = y(u,v)$ to convert the defining equations for R in the xy-plane into the defining equations for S in the uv-plane.

Step 2:

Find $|\det D_{(u,v)}G|$.

Step 3:

Use change of variables formula:

$R \mapsto S$	$x \mapsto x(u,v)$	Insert
$dxdy \mapsto dudv$	$y \mapsto y(u,v)$	$\lvert\det D_{(u,v)}G\rvert$