Abstract. We extend the classical Gauss–Bonnet theorem for the Euclidean, elliptic, hyperbolic, and Lorentzian planes to the other three Cayley–Klein geometries of dimension two, all three of which are absolute-time spacetimes, providing one proof for all nine geometries. Suppose that $M$ is a polygon in any one of the nine geometries. Let $\Gamma$, the boundary of $M$, have length element $ds$, discontinuities $\theta_i$, and signed geodesic curvature $\kappa_g$, where $M$ and $\Gamma$ are oriented according to Stokes’ theorem. Let $K$ denote the constant Gaussian curvature of the geometry with area form $dA$. Then

$$\int_{\Gamma} \kappa_g \, ds + \sum \theta_i + \int_M K \, dA = 2\pi$$

for the nonspacetimes and

$$\int_{\Gamma} \kappa_g \, ds + \sum \theta_i + \int_M K \, dA = 0$$

for the spacetimes, where we assume that $\Gamma$ is timelike.