8.16. Let $\mathscr{F}_n = \sigma(\{X_i\}_{i=1}^n)$ to find that

$$\mathrm{E}\left[\prod_{i=1}^{n+1}\frac{g(X_i)}{f(X_i)}\,\middle|\,\mathscr{F}_n\right] = \prod_{i=1}^{n}\frac{g(X_i)}{f(X_i)}\cdot\mathrm{E}\left[\frac{g(X_{n+1})}{f(X_{n+1})}\right] \qquad \text{a.s.}$$

But $\mathrm{E}[(g/f)(X_{n+1})] = \int_{-\infty}^{\infty}(g/f)(x)f(x)\,dx = \int_{-\infty}^{\infty}g(x)\,dx = 1$. This has the desired result.