8.4 g_s-factor of the electron.

Squaring the Dirac equation and using $\mathrm{i}\sigma^{\mu\nu}D_\mu D_\nu = \frac{\mathrm{i}}{2}\sigma^{\mu\nu}[D_\mu, D_\nu] = \frac{e}{2}\sigma^{\mu\nu}F_{\mu\nu}$ gives

$$(\mathrm{i}\not{D} + m)(\mathrm{i}\not{D} - m)\psi = -(\not{D}\not{D} + m^2)\psi = -\left(D_\mu D^\mu - \frac{e}{2}\sigma_{\mu\nu}F^{\mu\nu} + m^2\right)\psi = 0\,. \tag{182}$$

Comparing to the Klein-Gordon equation, we see that the spin of the electron leads to the additional interaction term $\sigma_{\mu\nu}F^{\mu\nu}$. Consider now a homogeneous magnetic field $\boldsymbol{B} = B\boldsymbol{e}_z$ or $F_{12} = B$. We choose the gauge $A_\mu = (0, -\frac{1}{2}Bx^2, \frac{1}{2}Bx^1, 0)$. Moreover we consider weak fields, neglecting quadratic terms in A. Then

$$D_i^2 \simeq \boldsymbol{\nabla}^2 - \mathrm{i}e(\partial_i A_i + A_i\partial_i) = \boldsymbol{\nabla}^2 - 2\mathrm{i}eA_i\partial_i = \boldsymbol{\nabla}^2 - 2\frac{\mathrm{i}e}{2}B(x^1\partial_2 - x^2\partial_1) = \boldsymbol{\nabla}^2 - \boldsymbol{BL}\,.$$

(Since $D_i^2\psi$, we applied the product rule in the second step.)
In the Dirac basis, a non-relativistic electron is $\psi = \binom{\phi}{\chi} \simeq \binom{\phi}{0}$. With $\sigma^{ij} = \varepsilon^{ijk}\begin{pmatrix}\sigma^k & 0\\ 0 & \sigma^k\end{pmatrix}$ it is

$$\frac{e}{2}\sigma^{\mu\nu}F_{\mu\nu} = \frac{e}{2}\sigma^3(F_{12} - F_{21}) = e\sigma^3 B. = 2e\boldsymbol{sB}.$$

Combined we find $H_{\rm int} = (\boldsymbol{L} + 2\boldsymbol{s})e\boldsymbol{B}$, i.e. the $g_s = 2$ factor of the electron
This was the first crucial test that the Dirac equation describes correctly electrons.