42. (a) Squaring Eq. 38-44 gives

$$E^2 = \left(mc^2\right)^2 + 2mc^2K + K^2$$

which we set equal to Eq. 38-52. Thus,

$$\left(mc^2\right)^2 + 2mc^2K + K^2 = (pc)^2 + \left(mc^2\right)^2 \implies m = \frac{(pc)^2 - K^2}{2Kc^2} \ .$$

(b) At low speeds, the pre-Einsteinian expressions $p = mv$ and $K = \frac{1}{2}mv^2$ apply. We note that $pc \gg K$ at low speeds since $c \gg v$ in this regime. Thus,

$$m \to \frac{(mvc)^2 - \left(\frac{1}{2}mv^2\right)^2}{2\left(\frac{1}{2}mv^2\right)c^2} \approx \frac{(mvc)^2}{2\left(\frac{1}{2}mv^2\right)c^2} = m \ .$$

(c) Here, $pc = 121\,\text{MeV}$, so

$$m = \frac{121^2 - 55^2}{2(55)c^2} = 105.6\ \text{MeV/c}^2 \ .$$

Now, the mass of the electron (see Table 38-3) is $m_e = 0.511\,\text{MeV/c}^2$, so our result is roughly 207 times bigger than an electron mass.