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$$\int_0^1 \frac{x^2}{x+1} dx = \int_0^1 x - 1 + \frac{1}{x+1} dx$$

long division

$$\begin{array}{r} x-1 \\ x \overline{) x^2+x} \\ \underline{x^2+x} \\ -x-1 \\ \underline{-x-1} \\ 1 \end{array}$$

$$\begin{aligned} \left. \frac{x^2}{2} - x + \ln|x+1| \right|_0^1 &= \frac{1}{2} - 1 + \ln 2 \\ &= \ln 2 - \frac{1}{2} \end{aligned}$$