Testing.

Start simply with the function $m(x) = -\frac{1}{x+121} + \frac{1}{x-7} = \frac{128}{x^2+114\,x-847}$.

After the second sage-silent block, we have that $f(x) = -\frac{3}{x+5} + \frac{2}{x-3} = -\frac{x-19}{x^2+2\,x-15}$.