

Pensieve header: The linear-compositional property of contraction of quadratics.

$$\text{In[*]} := \text{Act}[f\_ , g\_ ] := \frac{g}{1 - gf}$$

$$\text{In[*]} := \text{Act}[f1, g]$$

$$\text{Out[*]} = \frac{g}{1 - f1 g}$$

$$\text{In[*]} := \text{lhs} = \text{Act}[f1, \text{Act}[f2, g]]$$

$$\text{Out[*]} = \frac{g}{(1 - f2 g) \left(1 - \frac{f1 g}{1 - f2 g}\right)}$$

$$\text{In[*]} := \text{rhs} = \text{Act}[f1 + f2, g] // \text{Simplify}$$

$$\text{Out[*]} = \frac{g}{1 - (f1 + f2) g}$$

$$\text{In[*]} := \text{Simplify}[\text{lhs} == \text{rhs}]$$

$$\text{Out[*]} = \text{True}$$