Define *Euler's trilogarithm* by the series

$$\mathrm{Li}_3(z) = \sum_{k=1}^{\infty} \frac{z^k}{k^3}$$

for $|z| < 1$. Observe that $\mathrm{Li}_3'(z) = \frac{\mathrm{Li}_2(z)}{z}$.

1. Use the above to define a function element (D, Li_3) where D is a (sufficiently) small disc centered at $1/2$.

2. Starting at $z = 1/2$, compute the analytic continuation Li_3^γ of Li_3, still in a neighborhood of $1/2$, where γ is the curve:

   (a) winding once around the point $z = 0$;

   (b) winding once around the point $z = 1$.