

$$= -\frac{1}{2} \ln(\sqrt{3}-1) + \frac{1}{4} \ln 3 - \frac{1}{\sqrt{3}} + \frac{1}{4} \ln 4 - \frac{1}{4} \ln 3 - \frac{\pi}{12}$$

$$= -\frac{1}{2} \ln(\sqrt{3}-1) + \frac{\ln 2}{2} - \frac{1}{\sqrt{3}} - \frac{\pi}{12}$$

$$= -\frac{1}{2} \ln\left(\frac{2}{\sqrt{3}+1}\right) + \frac{1}{2} \ln 2 - \frac{1}{\sqrt{3}} - \frac{\pi}{12}$$

$$= \frac{1}{2} \ln(1+\sqrt{3}) - \frac{1}{\sqrt{3}} - \frac{\pi}{12}$$