$$\frac{15 - 7\sqrt{6}}{\sqrt{6}} - \frac{\sqrt{54}}{\sqrt{6}+3} + 3\sqrt{\frac{1}{6}}$$

Den Term auf Normalform bringen:

$$\frac{15 - 7\sqrt{6}}{\sqrt{6}} = \frac{15}{\sqrt{6}} - \frac{7\sqrt{6}}{\sqrt{6}} = \frac{15}{\sqrt{6}} \cdot \frac{\sqrt{6}}{\sqrt{6}} - 7 = \frac{15\sqrt{6}}{6} - 7 = \frac{5\sqrt{6}}{2} - 7$$

$$\frac{\sqrt{54}}{\sqrt{6}+3} = \frac{\sqrt{9 \cdot 6}}{\sqrt{6}+3} = \frac{3\sqrt{6}}{\sqrt{6}+3} \cdot \frac{\sqrt{6}-3}{\sqrt{6}-3} = \frac{3 \cdot 6 - 9\sqrt{6}}{6-9} = \left(18 - 9\sqrt{6}\right) : (-3) = -6 + 3\sqrt{6}$$

$$3\sqrt{\frac{1}{6}} = 3\sqrt{\frac{6}{36}} = 3 \cdot \frac{\sqrt{6}}{6} = \frac{\sqrt{6}}{2}$$

Zusammengefasst ergibt sich:

$$\begin{aligned}
\frac{15 - 7\sqrt{6}}{\sqrt{6}} - \frac{\sqrt{54}}{\sqrt{6}+3} + 3\sqrt{\frac{1}{6}} &= \left(\frac{5\sqrt{6}}{2} - 7\right) - \left(-6 + 3\sqrt{6}\right) + \frac{\sqrt{6}}{2} \\
&= \frac{5\sqrt{6}}{2} - 7 + 6 - 3\sqrt{6} + \frac{\sqrt{6}}{2} \\
&= \frac{6\sqrt{6}}{2} - 1 - 3\sqrt{6} \\
&= 3\sqrt{6} - 1 + 3\sqrt{6} \\
&= -1
\end{aligned}$$