1.

$$\frac{2}{ab}\frac{d^3}{d\theta^3}S_{true} = -2ab\big(1+m^2\big)\left(\frac{2\sin\theta\cos\theta}{L} - \frac{2abm\sin^3\theta}{L^2}\right) + \frac{dm}{d\theta}\left(-\frac{4abm\sin^2\theta}{L} + \cos\theta\right) - m\sin\theta - \cos\theta$$