41. When the log is on the verge of moving (just before its left edge begins to lift) we take the system to be in equilibrium with the static friction at its maximum value $f_{s,\max} = \mu_s N$. Thus, our force and torque equations yield

$$\begin{aligned} F\cos\theta &= f_{s,\max} && \text{horizontal forces} \\ F\sin\theta + N &= Mg && \text{vertical forces} \\ FL\sin\theta &= Mg\left(\tfrac{L}{2}\right) && \text{torques about rightmost edge} \end{aligned}$$

where L is the length of the log (and cancels out of that last equation).

(a) Solving the three equations simultaneously yields

$$\theta = \tan^{-1}\left(\frac{1}{\mu_s}\right) = 51^\circ$$

when $\mu_s = 0.8$.

(b) And the tension is found to be

$$T = \frac{Mg}{2}\sqrt{1+\mu^2} = 0.64Mg \ .$$