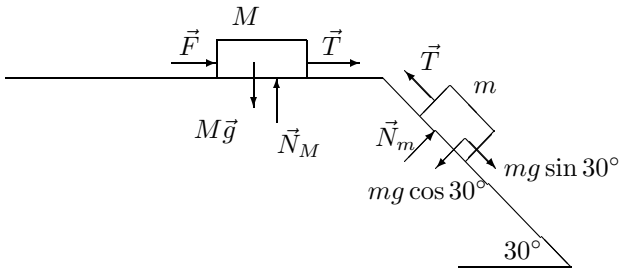
44. For convenience, we have labeled the 2.0 kg mass m and the 3.0 kg mass M. The $+x$ direction for m is "downhill" and the $+x$ direction for M is rightward; thus, they accelerate with the same sign.



(a) We apply Newton's second law to each block's x axis:

$$\begin{aligned} mg\sin 30° - T &= ma \\ F + T &= Ma \end{aligned}$$

Adding the two equations allows us to solve for the acceleration. With $F = 2.3$ N, we have $a = 1.8$ m/s^2. We plug back in to find the tension $T = 3.1$ N.

(b) We consider the "critical" case where the F has reached the *max* value, causing the tension to vanish. The first of the equations in part (a) shows that $a = g\sin 30°$ in this case; thus, $a = 4.9$ m/s^2. This implies (along with $T = 0$ in the second equation in part (a)) that $F = (3.0)(4.9) = 14.7$ N in the critical case.