

## Equations are hard to identify

The student has written the equation

$$mg - T = ma$$

The nearest canonical equation is

$$W_y + T_y = ma_y$$

To get the student's equation from this, one also needs to use the additional canonical equations

$$\begin{aligned} a_y &= a \sin \theta_a, & W_y &= W \sin \theta_W, & T_y &= T \sin \theta_T \\ \theta_a &= 270^\circ, & \theta_W &= 270^\circ, & \theta_T &= 90^\circ \\ W &= mg \end{aligned}$$

Thus the student has actually combined eight canonical equations in her head in writing down a fairly simple equation.