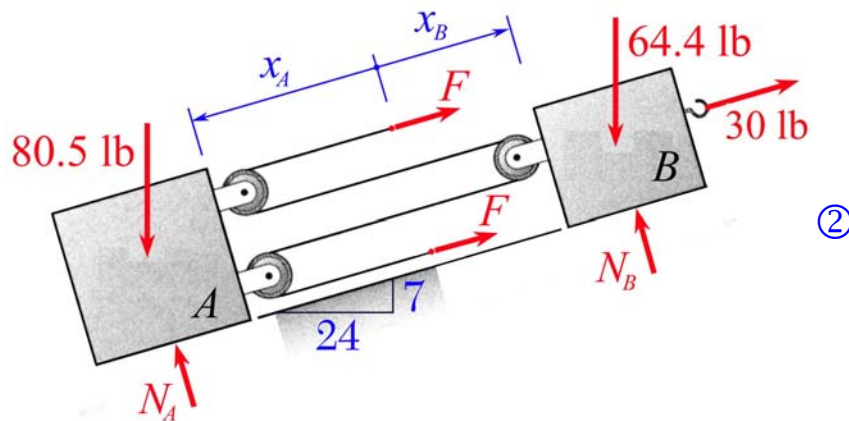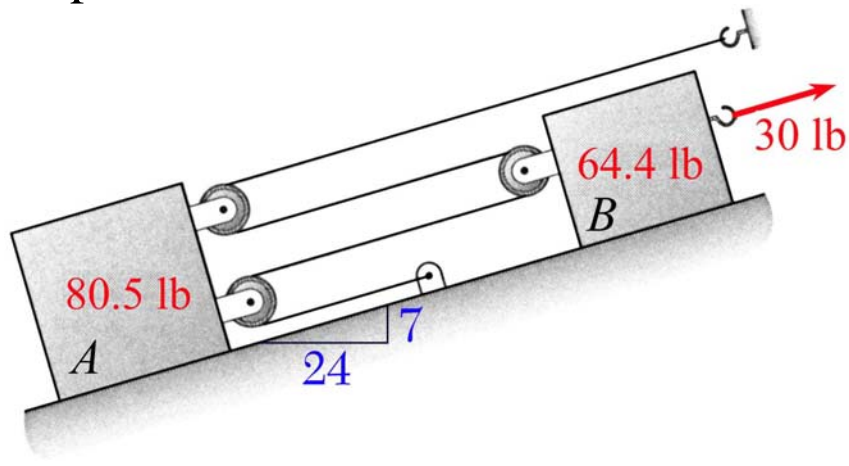The system is at rest when the 30-lb force is applied to the 64.4-lb block B as shown. Neglecting effects of friction, determine the speed of block B when the 80.5-lb block A has moved 1.5 ft up the incline.

$$4x_A + 2x_B = k \qquad 4(\Delta x_A) + 2(\Delta x_B) = 0 \qquad \Delta x_A = -1.5 \qquad \Delta x_B = 3 \qquad ②$$

$$4v_A + 2v_B = 0 \qquad v_A = -0.5\,v_B \qquad ②$$

$T_1 + U_{1\to2} = T_2$

$$0 + \left[80.5(-1.5)(7/25) + 64.4(-3)(7/25) + 30(3) \right]$$
$$= \frac{1}{2}(80.5/32.2)(-0.5\,v_B)^2 + \frac{1}{2}(64.4/32.2)(v_B)^2 \qquad ③$$

$$v_B = 1.2631 \qquad \boxed{v_B = 1.263 \text{ ft/s}} \qquad ①$$