

$$\sum F_y = T_{2y} + T_{1y} - 196\text{N} = 0\text{N}$$

$$T_{2y} = T_{1y} \Rightarrow 2T_{1y} - 196\text{N} = 0$$

$$2T_{1y} = 196\text{N}$$

$$T_{1y} = 98\text{N} = T_{2y}$$

$$\sin 20^\circ = \frac{T_{2y}}{T_2}$$

$$T_2 = \frac{T_{2y}}{\sin 20^\circ}$$

$$T_2 = \frac{98\text{N}}{\sin 20^\circ}$$

$$T_2 = 287\text{N}$$

② $a = 5.3\text{m/s}^2$ uphill

$$T = 89.4\text{N}$$

$$\sum F_{||} = 196\text{N} - 34.3\text{N} - 17.8\text{N} = 144\text{N}$$

$\uparrow W_{||}$ $\uparrow F_{fr}$

$$W_{||} = \sin 30^\circ W$$

$$= 0.5(68.6\text{N})$$

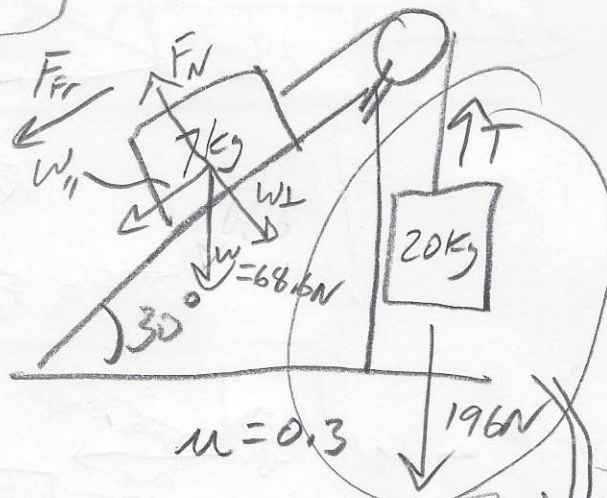
$$= 34.3\text{N}$$

$$W_{\perp} = \cos 30^\circ W$$

$$= 59.4\text{N}$$

$$F_{fr} = \mu(F_N) = \mu W_{\perp}$$

$$= 0.3(59.4\text{N}) = 17.8\text{N}$$



$$\sum F_{||} = ma = 27\text{kg}(a)$$

$$27\text{kg}(a) = 144\text{N}$$

$$a = 5.3\text{m/s}^2$$

uphill

Finding tension with 20kg block...

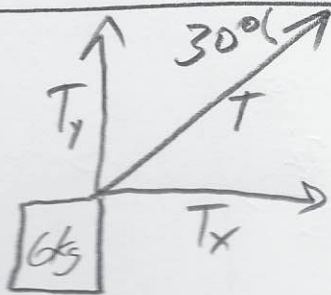
$$\sum F_{20\text{kg}} = T - 196\text{N} = 20\text{kg}(-5.3\text{m/s}^2)$$

$$T = 89.4\text{N}$$

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$$a = 17 \text{ m/s}^2$$

$$T = 118 \text{ N}$$



$$W = 58.8 \text{ N}$$

$$\sum F_x = T_x = 102 \text{ N} = ma$$

$$102 \text{ N} = 6 \text{ kg}(a)$$

$$a = 17 \text{ m/s}^2 \text{ rightward}$$

$$\sum F_y = T_y - W = ma = 6 \text{ kg}(0)$$

$$T_y = W = 58.8 \text{ N}$$

$$\frac{T_y}{T} = \sin 30^\circ$$

$$T = \frac{T_y}{\sin 30^\circ} = \frac{58.8 \text{ N}}{0.5} = 117.6 \text{ N}$$

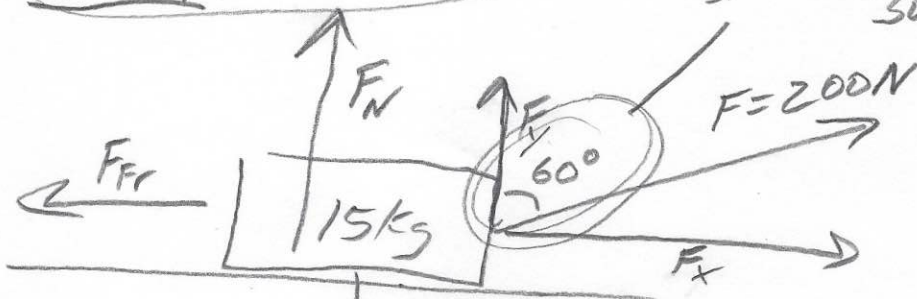
$$T_x = \cos 30^\circ (T)$$

$$T_x = 0.866 (118 \text{ N}) = 102 \text{ N}$$

④

$a = 10.6 \text{ m/s}^2$ rightward

I changed this from 30°



$$W = mg = 147 \text{ N}$$

$$\mu = 0.3$$

$$F_y = \cos 60^\circ (200 \text{ N}) = 100 \text{ N}$$

$$F_x = \sin 60^\circ (200 \text{ N}) = 173 \text{ N}$$

$$\Sigma F_y = F_N + F_y - W = ma$$

no vertical accel

$$= F_N + 100 \text{ N} - 147 \text{ N} = 0$$

$$F_N = 47 \text{ N}$$

$$F_{fr} = \mu F_N = 0.3 (47 \text{ N}) = 14.1 \text{ N}$$

$$\Sigma F_x = F_x - F_{fr} = ma$$

$$= 173 \text{ N} - 14.1 \text{ N} = 158.9 \text{ N} = 15 \text{ kg}(a)$$

$$158.9 \text{ N} = 15 \text{ kg}(a)$$

$$a = 10.6 \text{ m/s}^2 \text{ to the right}$$