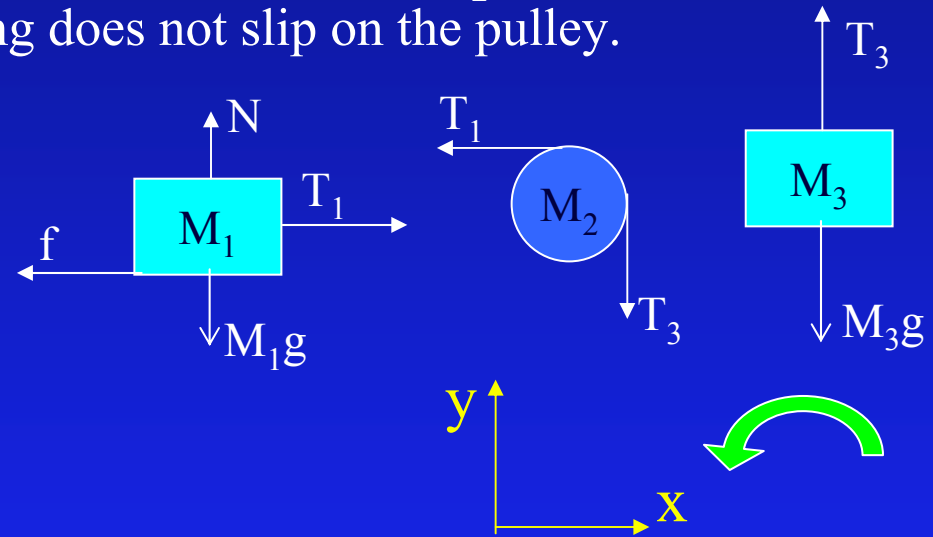


Homework 9 Help

A block of mass $M_1 = 3 \text{ kg}$ rests on a table with which it has a coefficient of friction $\mu = 0.73$. A string attached to the block passes over a pulley to a block of mass $M_3 = 5 \text{ kg}$. The pulley is a uniform disk of mass $M_2 = 0.7 \text{ kg}$ and radius 15 cm . As the mass M_3 falls, the string does not slip on the pulley.

Newton's 2nd Law

- 1) $T_1 - f = M_1 a_1$
- 2) $T_1 R - T_3 R = I \alpha_2$
- 3) $T_3 - M_3 g = M_3 a_3$



Notes:

- 1) $f = \mu M_1 g$
- 2) $\alpha_2 = -a_1 / R$
- 3) $I = \frac{1}{2} M R^2$
- 4) $a_1 = -a_3$

Rewrite ($a = a_1$)

- 1) $T_1 = M_1(a + \mu g)$
- 2) $T_3 - T_1 = \frac{1}{2} M_2 a$
- 3) $T_3 = M_3 (g - a)$

