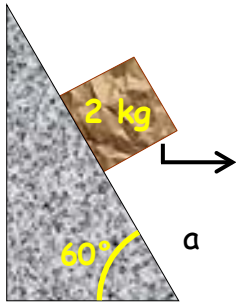


HOMEWORK SET 3: FUN WITH NSL
 Due: Wednesday, September 6, 2023

Sketch each situation and an FBD for each object (just the kid in #1, not the elevator).

- 1) A 60 kg child is standing on a scale in an elevator. What does the scale read when
 - a) the elevator is descending at a constant rate of 10 m/s?
 - b) the elevator is accelerating downward at 2 m/s²?
 - c) the elevator is ascending at 10 m/s but its speed is decreasing by 2 m/s each second?



- 2) A 2 kg body rests on a smooth wedge that has an inclination of 60° and an acceleration, a , to the right such that the mass remains stationary relative to the wedge.
 - a) Find a .
 - b) What would happen if the wedge were given a greater acceleration?

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

PROBLEMS FROM THORNTON & MARION (5TH ED.) (TM5)

-- When TM5 gives answers, match their algebraic form!

- 3) 2-16 A particle is projected with an initial velocity v_0 up a slope that makes an angle α with the horizontal. Assume frictionless motion and find the time required for the particle to return to its starting position. Find the time for $v_0 = 2.4 \text{ m/s}$ and $\alpha = 26^\circ$.

- 4) 2-32 Two blocks of unequal mass are connected by a string over a smooth pulley. If the coefficient of kinetic friction is μ_k , what angle θ of the incline allows the masses to move at a constant speed? (HINT: I ENDED UP APPLYING THE QUADRATIC FORMULA TO AN EQUATION IN $\sin \theta$: $A \sin^2 \theta + B \sin \theta + C = 0$)

