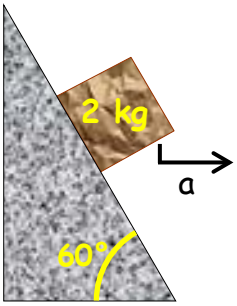
HOMEWORK SET 3: FUN WITH NSL
Due: Wednesday, September 11, 2024

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/s^2?
- **c)** the elevator is ascending at 10 m/s but its speed is decreasing by 2 m/s each second?

Start with $\sum F = m\vec{a}$ each time, paying attention to the directions of $\vec{a}$ and $m\vec{g}$.

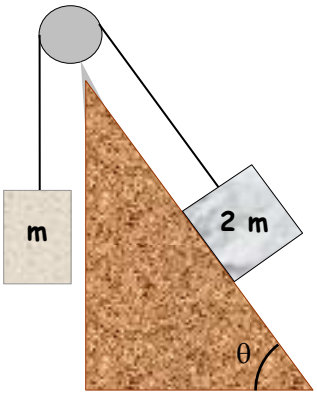
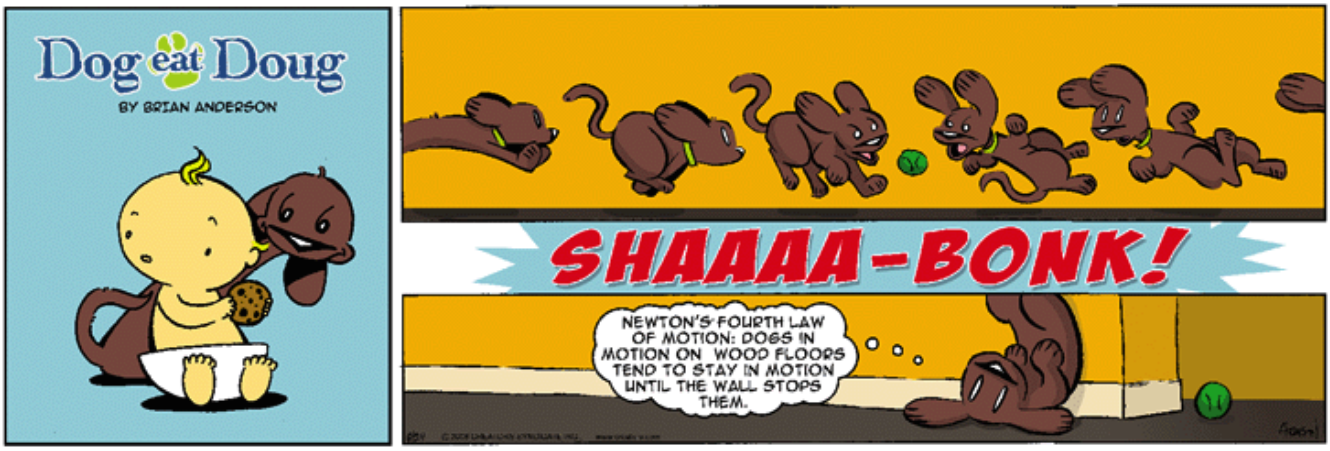


2) A 2 kg body rests on a smooth wedge that has an inclination of 60° and an acceleration, a, to the right such that the mass remains stationary relative to the wedge.
- **a)** Find a.
- **b)** What would happen if the wedge were given a greater acceleration?

Answer: a) a = 17 m/s^2

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

-- *When TM5 gives answers (in back of book), match their algebraic form!*

3) *2-16* A particle is projected with an initial velocity v_o 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_o = 2.4 m/s and α = 26°.

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 θ: $A\sin^2\theta + B\sin\theta + C = 0$)