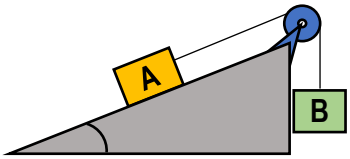
CONCEPT: CONNECTED OBJECTS ON INCLINED PLANES WITH FRICTION

- Some problems will combine **multiple** objects *on* ramps *with* friction**!** Usually, you'll know which kind of friction is acting**.**
  - To solve, use all the problem-solving steps for systems of objects, inclined planes, and friction**.**

EXAMPLE**:** Two blocks are connected by a cable & massless pulley**.** Block B pulls Block A, which moves up the 30° incline**.** Block B weighs 100N (m_B = 10.2kg), block A weighs 40N (m_A = 4.1kg)**.** If μ_k = 0.15, find the acceleration of the system**.**

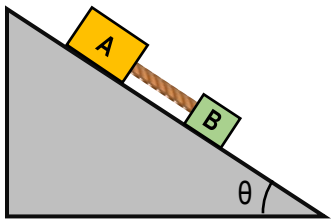


CONNECTED OBJECTS + INCLINED PLANES + FRICTION

1) Draw FBD for all obj's, choose direction of **+**
2) Determine if $\boldsymbol{f} = \boldsymbol{f_s}$ or $\boldsymbol{f_k}$ from text or:
If ΣFs on axis of motion > $f_{s,max}$, $\boldsymbol{f} = \boldsymbol{f_k}$
3) Write **ΣF=ma,** start with simplest (fewest **F**s)
4) Solve **a** (EQ Addition / Substitution)
5) Plug **a** into eq's, solve other targets if needed

PROBLEM: Two blocks made of different materials, connected by a string, slide down a 30° inclined plane . Block A has mass 8kg, and the coefficient of kinetic friction between Block A and the incline is 0.35. Block B has mass 4kg, and the coefficient of friction between block B and the plane is 0.25. After the blocks are released, find the tension in the cord.

A) 1.23 N
B) 2.21 N
C) 1.67 N
D) 2.28 N



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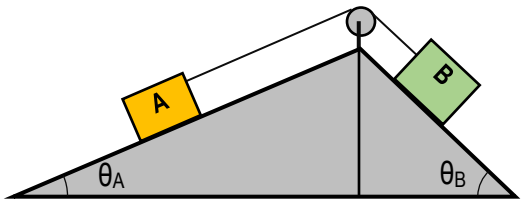
PROBLEM: Two blocks, A and B, sit on back-to-back rough inclined planes and are connected to each other by a cable. The angles of the planes are θ_A=15° and θ_B=30°. The masses of the blocks are m_A=2kg and m_B=5kg, and μ_k=0.2. When the blocks are released from rest and begin moving, what is the magnitude of their acceleration?

A) 2.47 m/s^2
B) 1.02 m/s^2
C) 3.45 m/s^2
D) 10.5 m/s^2



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