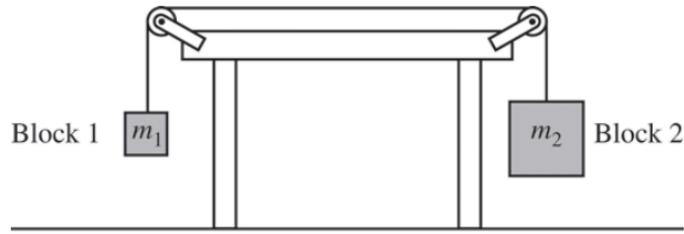


AP Physics 1 Released FRQ - 2015 - Newton's Laws



Note: Figure not drawn to scale.

1. (7 points, suggested time 13 minutes)

Two blocks are connected by a string of negligible mass that passes over massless pulleys that turn with negligible friction, as shown in the figure above. The mass m_2 of block 2 is greater than the mass m_1 of block 1. The blocks are released from rest.

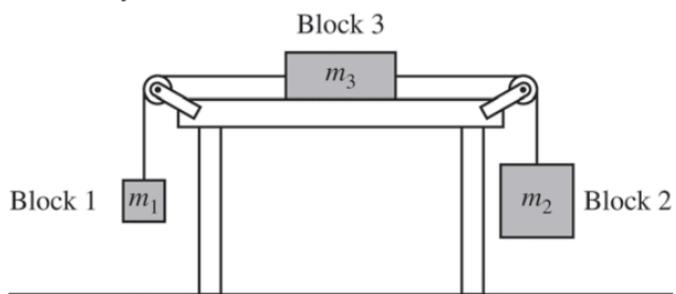
- (a) The dots below represent the two blocks. Draw free-body diagrams showing and labeling the forces (not components) exerted on each block. Draw the relative lengths of all vectors to reflect the relative magnitudes of all the forces.

Block 1	Block 2

●	●

- (b) Derive the magnitude of the acceleration of block 2. Express your answer in terms of m_1 , m_2 , and g .

Block 3 of mass m_3 is added to the system, as shown below. There is no friction between block 3 and the table.



Note: Figure not drawn to scale.

- (c) Indicate whether the magnitude of the acceleration of block 2 is now larger, smaller, or the same as in the original two-block system. Explain how you arrived at your answer.

