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M1 = 800 g

M2 = 400 g

An 800 g block lies on a horizontal tabletop. The friction between the table and the block is negligible. The block is connected by a massless string to the second block with a mass of 400 g. The string passes over a light frictionless pulley as shown above. The system is released from rest.

A. Draw a clearly labeled free body diagram for m1. Include all forces and next to the free body diagram draw the direction of the block’s expected acceleration, a1.

B. Draw a clearly labeled free body diagram for m2. Include all forces and next to the free body diagram draw the direction of the block’s expected acceleration, a2.

C. Use Newton’s Second Law to write an equation for the tension (T) in the string based on your free body diagram for m1.

**Ft = m1a**

D. Use Newton’s Second Law to write an equation for the tension (T) in the string based on your free body diagram for m2.

**Ft = m2 g + m2(-a)**

E. Find the acceleration (a) of the system (hint: use both of the equations from parts C and D, Tension Force is the same for both masses)

**m1a = m2 g + m2(-a)**

**a = m2g/(m2 + m1)**

**a = 3.27 m/s2**

F. Find the tension force in the string.

**Ft = m1a**

**Ft** = 2.61 N