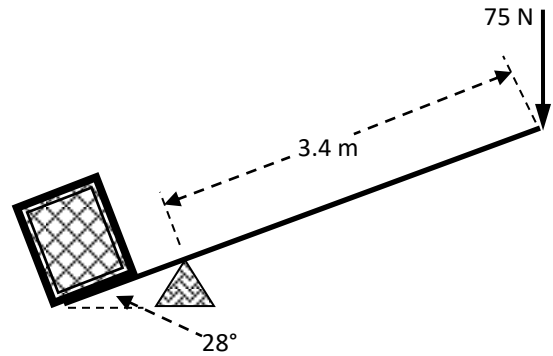*Lesson 1 Practice Assignment*
The Concept of Torque

1. A smart physics student attempts to lift a heavy
    crate by using a lever system with a vertically
    downward force of 75 N, as shown to the right.
   What torque is created by this student?

    75 N

    3.4 m

    28°

2. In the diagram to the right, the uniform beam has a mass
    of 25.0 kg and exerts a ccw torque of 342 N-m, relative to
    pivot **P**. Determine the length of the beam.

    38°

    P
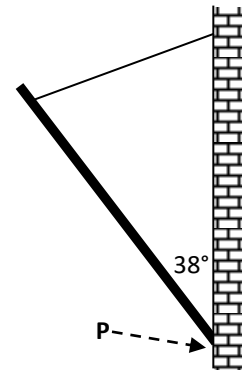
3. In the diagram to the right, a cable is attached 4.7 m from one end
    of a 13.8 m-long uniform beam and fastened to the wall.

    78.0°

    4.7 m

    62.0°

    P

    a) If the tension force in the cable is 575 N, what ccw torque does
        It exert on the beam, relative to pivot **P**?

    b) The beam's weight exerts the same torque in the cw direction,
        relative to pivot **P**. What is its mass?
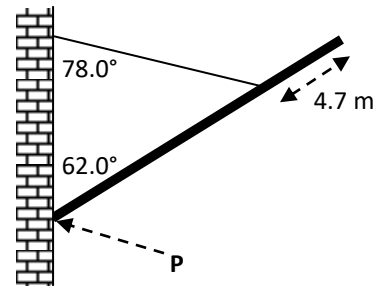
4. A heavy uniform plank of mass 55 kg and length 4.8 m is attached to a wall hinge and pulled upward by a
    force of 4.6×10^2 N as shown below. What is the net torque on the plank in the horizontal position shown?

    37°

    $F = 4.6 \times 10^2$ N

5. Calculate the net torque acting in the system below. Note that the beam is uniform, has a mass of 0.85 kg, and a length of 6.2 m.

← 1.0 m → ← 1.4 m →

0.16 kg

0.28 kg
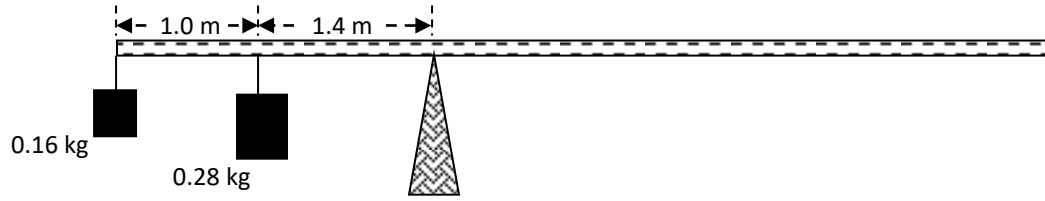
ANSWERS

1. $\tau = 2.3 \times 10^2$ N-m

2. $l = 2.27$ m

3a) $\tau = 3.36 \times 10^3$ N-m

3b) $m = 56.3$ kg

4. $\tau = 4.7 \times 10^2$ N-m, counterclockwise

5. $\tau = 1.8$ N-m, counterclockwise