# To do ...

- **CBTF Quiz 6** – next week!

- 211 students **DO NOT TAKE** 210 final, or you will get a zero on 211 final

- HW 21 due **Sat**

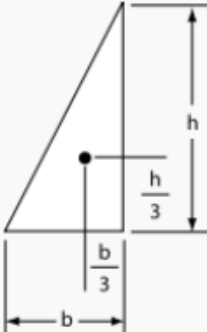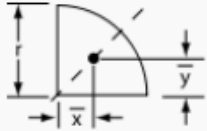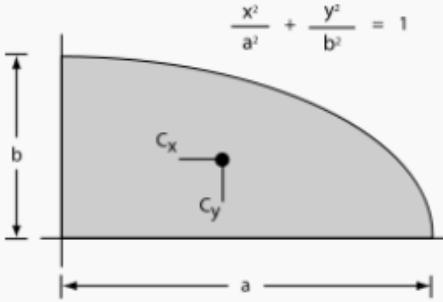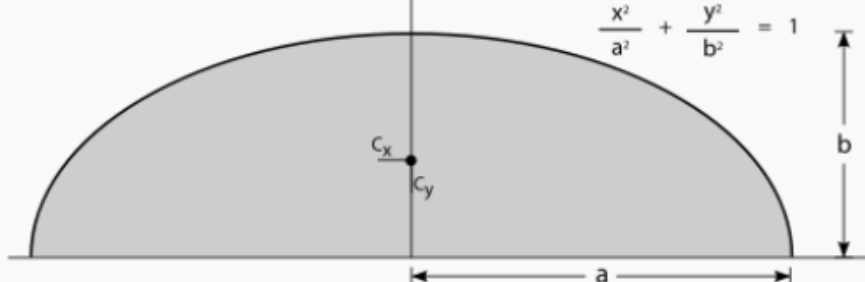- HW 22 due **Tues**

- HW 23 due **Thurs**

Composite bodies

A composite body consists of a series of connected simpler shaped bodies.

Such body can be sectioned or divided into its composite parts and, provided the weight and location of the center of gravity of each of these parts are known, we can then eliminate the need for integration to determine the center of gravity of the entire body.
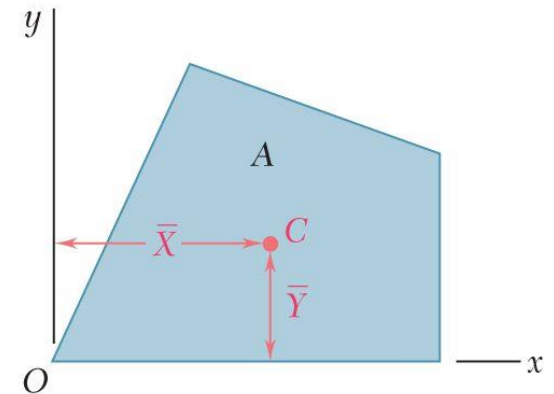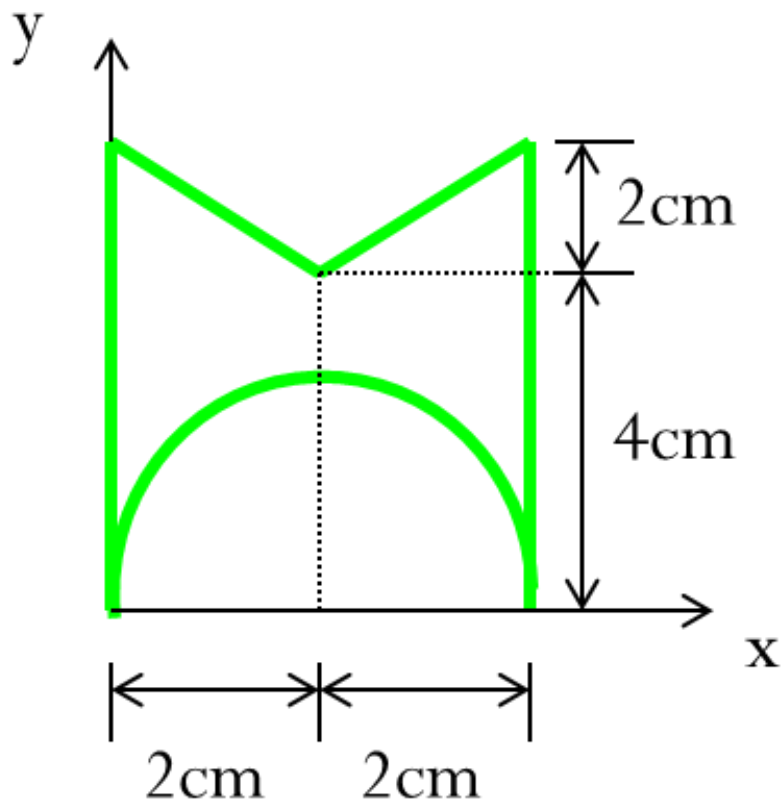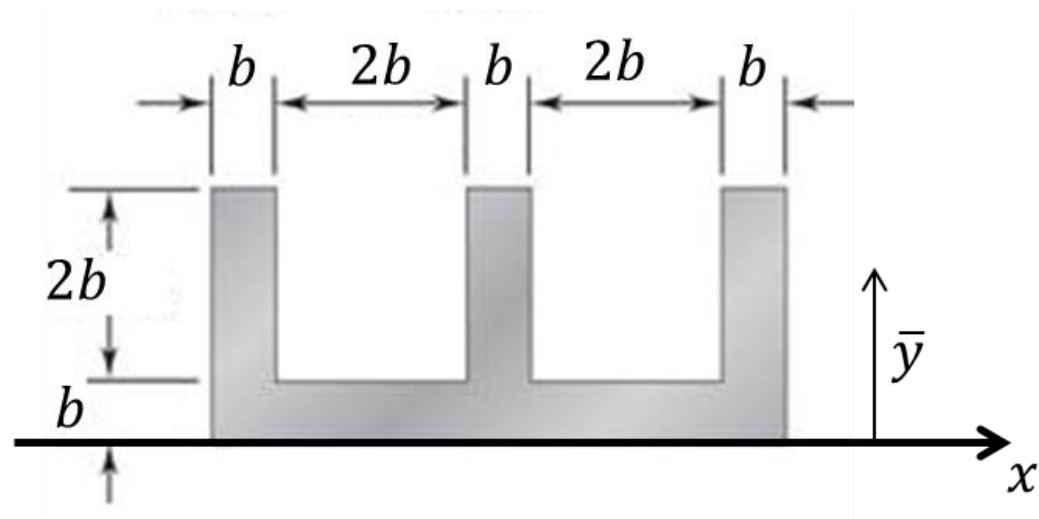
Centroid of typical 2D shapes

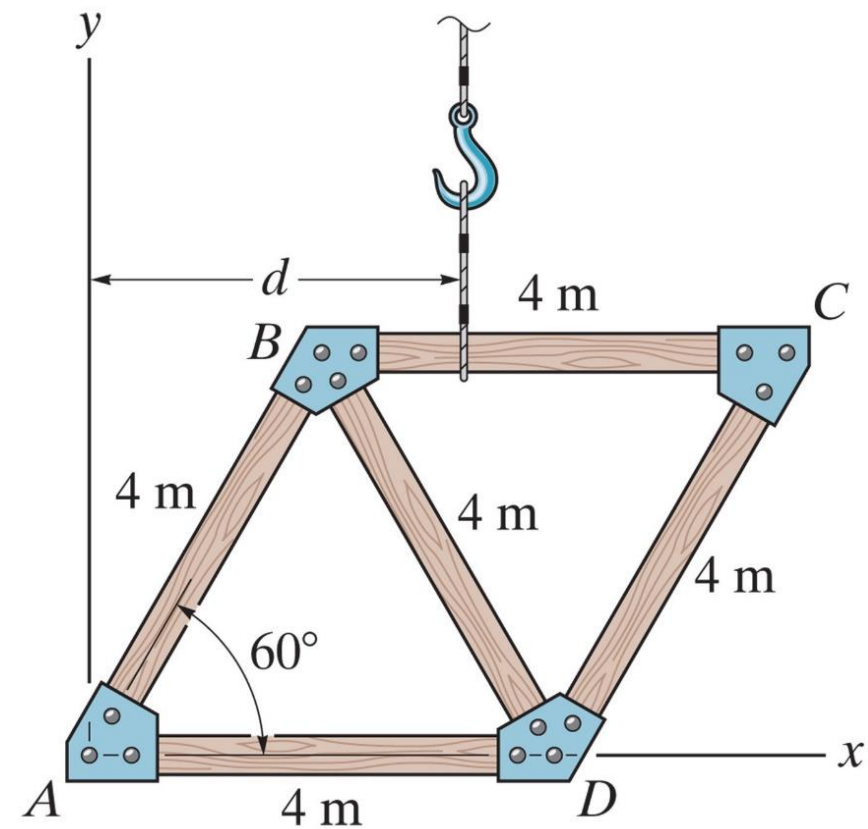| Shape	Figure	$\bar{x}$	$\bar{y}$	Area
Right-triangular area		$\dfrac{b}{3}$	$\dfrac{h}{3}$	$\dfrac{bh}{2}$
Quarter-circular area		$\dfrac{4r}{3\pi}$	$\dfrac{4r}{3\pi}$	$\dfrac{\pi r^2}{4}$
Semicircular area		0	$\dfrac{4r}{3\pi}$	$\dfrac{\pi r^2}{2}$
Quarter-elliptical area		$\dfrac{4a}{3\pi}$	$\dfrac{4b}{3\pi}$	$\dfrac{\pi ab}{4}$
Semielliptical area		0	$\dfrac{4b}{3\pi}$	$\dfrac{\pi ab}{2}$

Find the centroid of the area below.
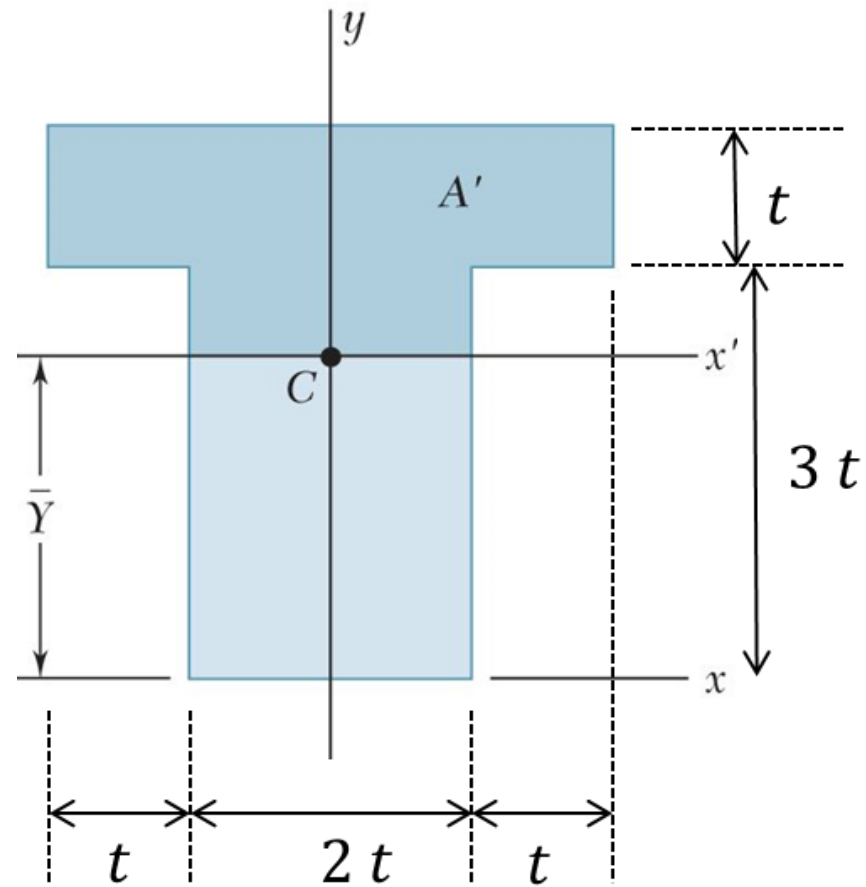
What is the centroid of the resultant area?

Find the centroid of the area below.

The truss is made from five members, each having a length of 4 m and a mass of 7 kg/m. Determine the distance d to where the hoisting cable must be attached, so that the truss does not tip (rotate) when it is lifted.

1. Rear wheels   18 lb
2. Mechanical components 85 lb
3. Frame   120 lb
4. Front wheel   8 lb

y

③

②

④

①

1 ft

1.50 ft

2 ft

1.30 ft

A

B

x

2.30 ft

1.40 ft

0.80 ft
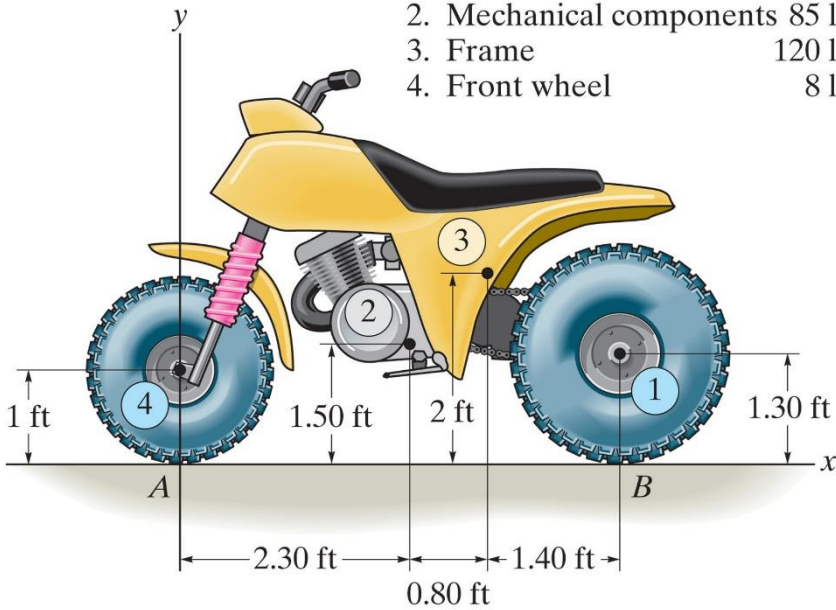
Determine the location of the center of gravity of the three-wheeler. If the three-wheeler is symmetrical with respect to the x-y plane, determine the normal reaction each of its wheels exerts on the ground.

4 ft

4 ft

3 ft
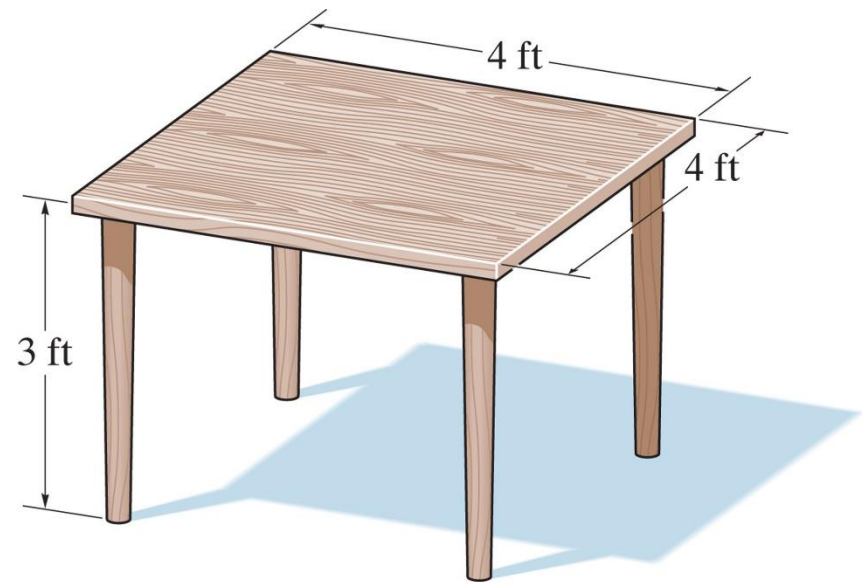
The wooden table is made from a square board having a weight of 15 lb. Each of the legs weighs 2 lb and is 3 ft long. Determine how high its center of gravity is from the floor. Also, what is the angle through which its top surface can be tilted on two of its legs before it begins to overturn?