11.3 Homework: Compound shapes and their volumes
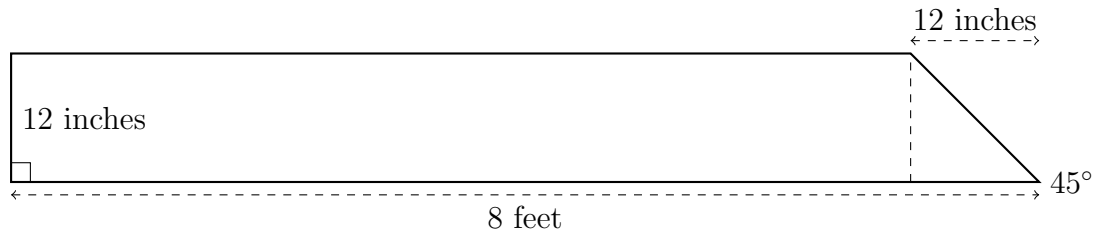
1. A wooden board is cut square at one end and at a 45° angle at the other. Overall it is 8 feet long, 12 inches wide, and 2 inches thick.

(a) Determine and state the volume of the board to the *nearest cubic inch.*

(b) Find the weight of the board, to the *nearest pound.* Use 44 lbs/ft^3 for the density of wood.

2. New streetlights will be installed along a section of the highway. The posts for the streetlights will be 7.5 m tall and made of aluminum. The city can choose to buy the posts shaped like cylinders or the posts shaped like rectangular prisms. The cylindrical posts have a hollow core, with aluminum 2.5 cm thick, and an outer diameter of 53.4 cm. The rectangular-prism posts have a hollow core, with aluminum 2.5 cm thick, and a square base that measures 40 cm on each side.

Sketch the two shapes (cylinders & rectangular prisms), and calculate their volumes.

The density of aluminum is 2.7 g/cm^3, and the cost of aluminum is \$0.38 per kilogram.

If all posts must be the same shape, which post design will cost the town less?

How much money will be saved per streetlight post with the less expensive design?