### Sample Calculations

1. Torque

Object



Force Applied = 2000 N

Object’s mass = 50 kg

θ = rad = 7.5 ᵒ

r = 5 m

Object applying force

Center of Mass

Distance from axis

Calculating torque is basically

and then adding all the sources of torque together.

1. Center of mass (CoG)

Triangular part

Base = 6m

Height = 8m

Rectangular part

Height = 8m

Base = 16m

CoG = center = (B/2, H/2)

“Void” space

Radius = 2 m

CoG = center

Step 1 is to pick your shape and split it into ‘common geometrical shapes’

Step 2 is to put it on a graph / X, Y (and/ or Z) coordinate system and Identify the points of the shape

Y - Axis

(7,16)

(-6,8)

(10,8)

(4,8)

(7,2)

X - Axis

(0,0)

step 3 Find each individual shape’s center of Mass and ‘weight’ (area or volume)

Y - Axis

Triangle

*CoG =* (7, 10.666667)

Rectangle

W = B \* H

W = 8 \* 16 = 128

X - Axis

Circle

*CoG* = (7,2)

Last is to calculate the combine object’s center of mass

The Center of mass (CoG) of the whole object is at the coordinate (2.410002574, 5.327748134)

//these are formulas I made but have not used.

= 0

= 0