<u>Directions:</u> Solve each problem by showing all your work!!!!!

1.   A bar 4.0 m long weights 400N. Its center of gravity is 1.5 m from one end. If a weight of 300 N is attached at the heavy end and a weight of 500 N is attached at the light end. What is the magnitude, direction, and point of application of the equilibrant?

                [∴ 1200 N, up @ 2.17 m from 300 N force or the heavy end of the bar]

2.   A bar 5.0 m long has its center of gravity 2.0 meters from the heavy end. If it is placed on the edge of a block 0.75 m from the light end and a weight of 1200 N added to the light end, it will be balanced. What is the weight of the bar?

            [400 N]

3.   A uniform steel girder is 15.0 m, weighs 20,000 N. From end "A" a weight of 4000 N is hung. At "B", the other end of the pole, there is a weight of 3000 N. An upward force of 5000 N is exerted 6.0 meters from "B", while an upward force of 2000 N is exerted 4.5 meters from "A". Determine the magnitude, direction, and point of application of the equilibrant.

           [7.05 m from end "A"]

4.   If a truck measures 2.5 meters between the outer tires, and is parked on a curve which slopes at an angle of 15 degrees, what is the maximum height of the center of gravity for stable equilibrium?   [4.7 m]