AP Physics: Torque Problems 1 Name:_____

Directions: Please show all of your work to receive full credit.

1. A 250000 N steel beam is 5 m long. How much force is needed to lift one end?

_____ N

2. A 400n bar is 4m long. Its center of gravity is 1.5m from one end. A 300n weight is hung at the heavy end and a 500n weight is hung at the light end. At what point and what force must you apply the force to balance the bar?

_____ m from heavy end

_____ N

3. A 875n painter stands on a 3m plank supported at each end by a stepladder. If the plank weighs 223n and the painter stands 1 m from one end, what force is exerted by each stepladder?

_____ n close to painter

_____ n farther

4. A 800n bricklayer stands 1 m from one end of a 3m long scaffold. If the scaffold is 750n and a 320n pile of bricks is 1.5m from the other end, what force must be exerted on each end of the scaffold to support it?

_____n bricklayer end

_____ n other

5. A 320n bench is 2.4m long. The legs are .3m from each end and weigh 15n each. If 3 persons weighing in order ,500n , 750n, and 1000n sit .4m, 1.2m, and 2m respectively from 1 end of the bench, what downward force must each set of legs exert on the floor?

_____ n leg 1

_____ nleg 2

6. A 36.5m bridge weighs 2.56 E 5 n. A 52400n truck is 10.2m from one end. Find the upward force that must be exerted by each pier to support this weight.

_____ n close to truck

_____ n farther

7. A bar 5 m long has its center of gravity 1.5m from one end. If it is placed on the edge of a block 1.5m from the light end and a weight of 750n is placed on the bar at the light end, it will be balanced. What is the weight of the bar?

_____ n

8. A 25m bar weighs 10000n. From end A a 2500 is hung. At B there is a weight of 3500. An upward force of 3000n is exerted 4m from B while an upward force of 4000n is exerted 8m from A. Find the distance and the force needed to balance the bar.

_____ n

_____ m

9. A 204n door is 2.5 m high and 1 m wide. The hinges are .3 m from the top and bottom. If each hinges supports half the weight of the door, find the horizontal force on each hinge.

_____n

10. Find the torques exerted on the rod. Find the balancing distance and force on the rod