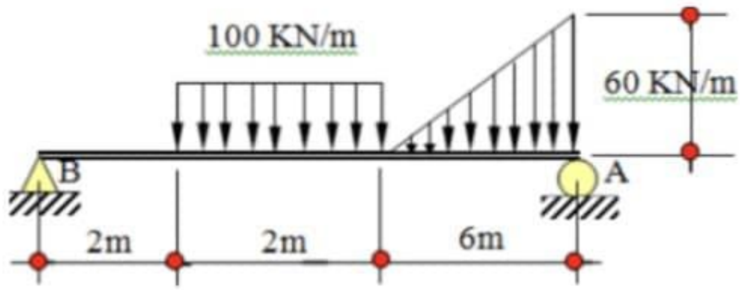
# Beam Problems 2,3 – Support Forces (and Shear/Moment Diagrams)

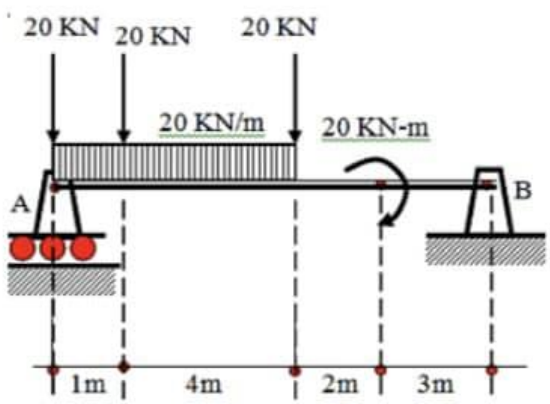
These two beam problems simply ask for the support forces which can be found by summing force compnents (x and y) and moments about any point. Since I have a video explaining shear and moment diagrams across the length of the beam those are also included here.

When summing forces and moments a distributed force can be considered equivalent to the total force which is distributed applied as a point force at one location (i.e. the *equivalent point load/force*). For a uniform distribution the total force is intensity (force/length) time length and the location to apply this is in the center. For a triangular intensity function the total force is maximum intensity times lenth times one half, assuming the minimum intensity is zero, and the location to apply the equivalent force is 2/3 of the way from the low end at zero to the maximum [e.g. (2/3)(6m)=4m].

2. Determine the hinge reactions at point B and roller reaction at A for the beam shown.

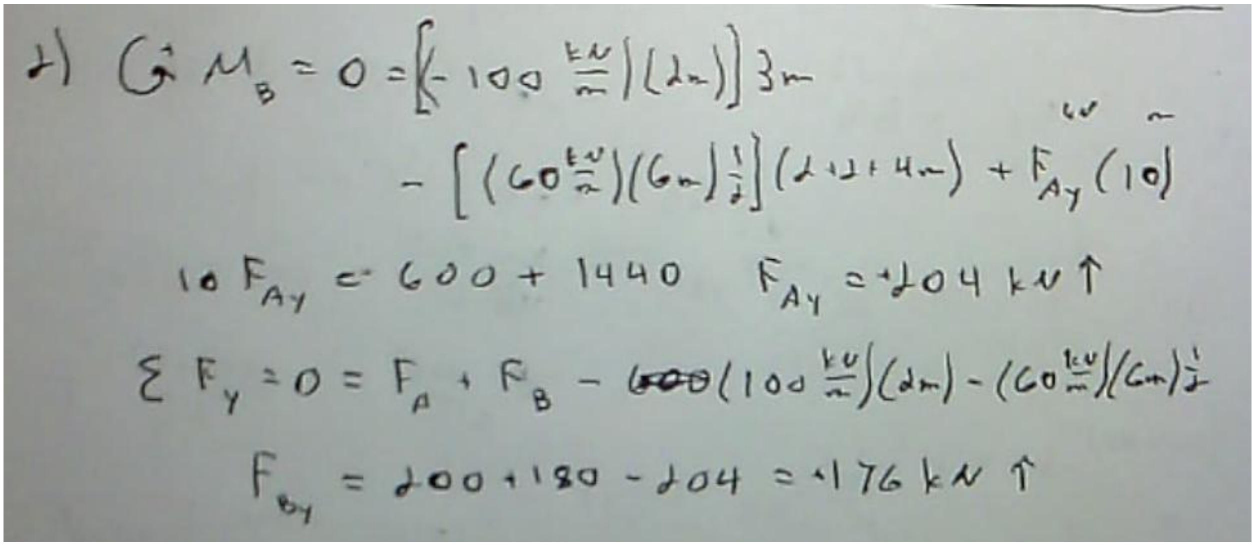



3. Determine the hinge reactions at point B and the roller reaction at A of the beam shown.



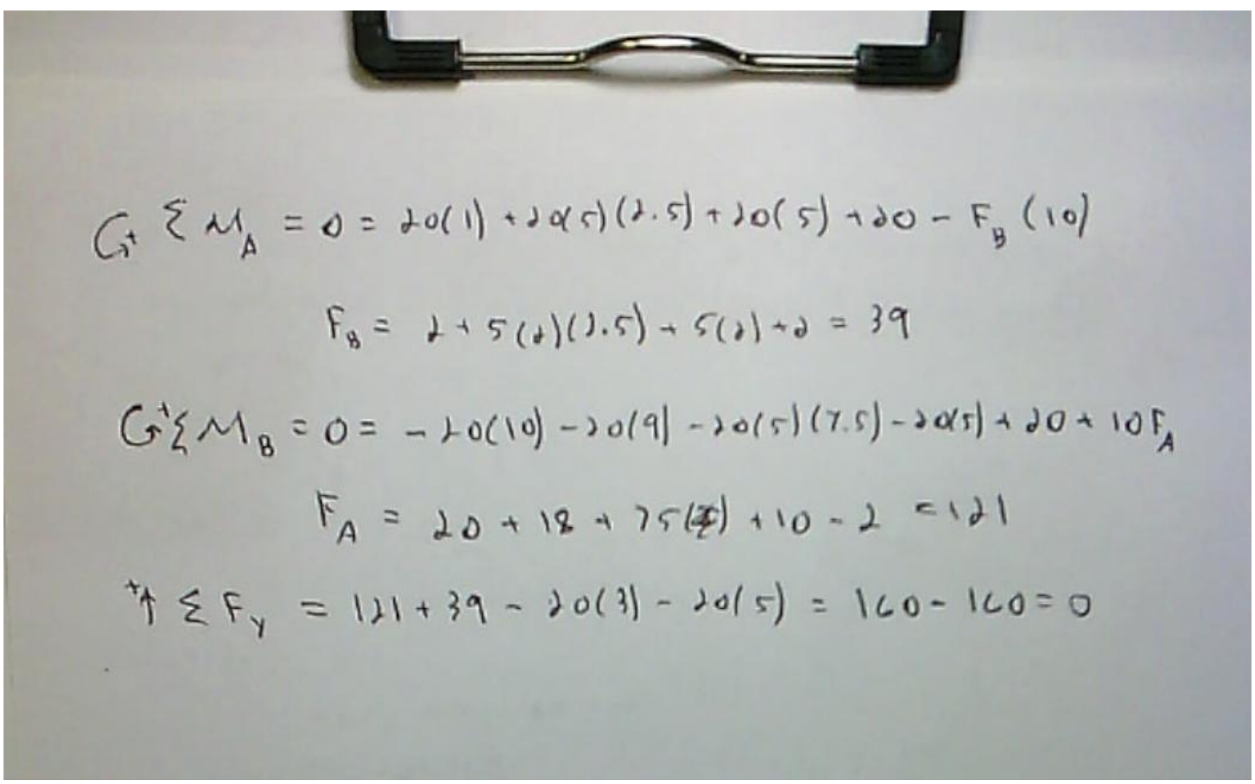
**Solutions for the support forces:**

Problem 2:




Problem 3:

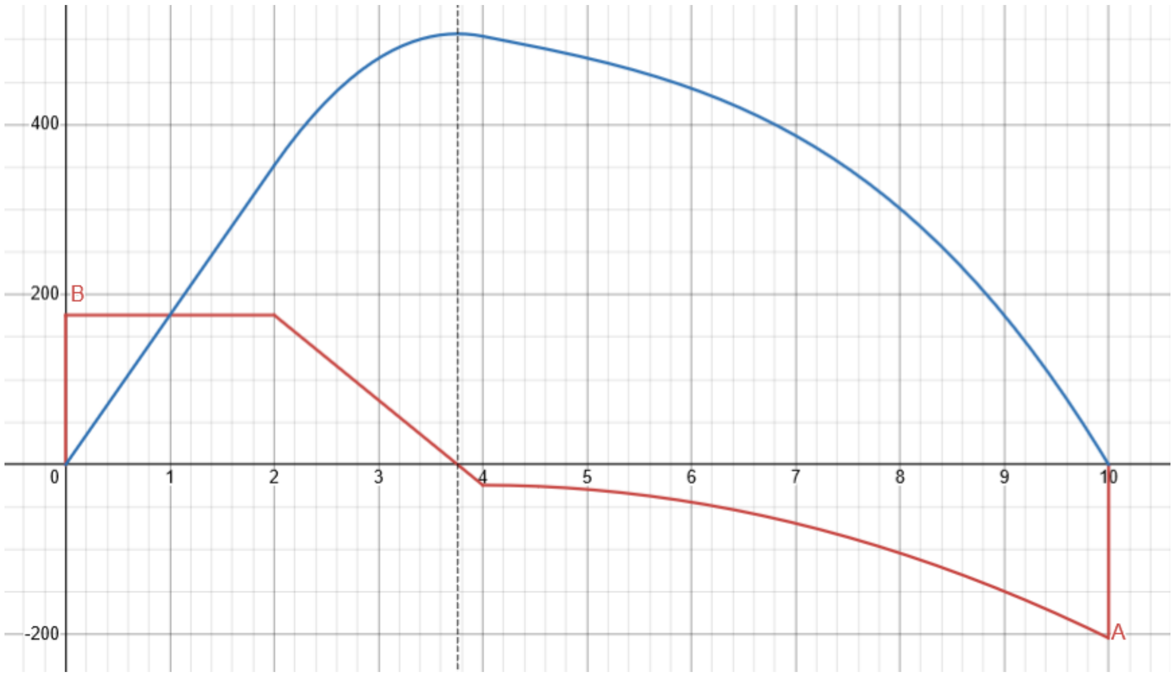
Note that the applied moment is just summed directly, no need for a "moment arm" or anything. The value has moment units as it is, 20 kN-m. The sum of the y forces serves as a check and is not necessary for finding the problem solution (i.e. $F_A$ and $F_B$).



**Shear and Moment Diagrams**

For both problems the red is the shear diagram, blue is the moment diagram. The linked Desmos pages show the equations used. For an explanation of these diagrams see my video here: https://www.youtube.com/watch?v=BR3s11KKdMk

**Problem 2: (The Desmos page is: https://www.desmos.com/calculator/kpbzfeplzb )**




**Problem 3: (The Desmos page is: https://www.desmos.com/calculator/utaxymfqyz )**

Notice that at x=4.05 the shear is zero and since that is the derivative of moment the moment is a maximum there.