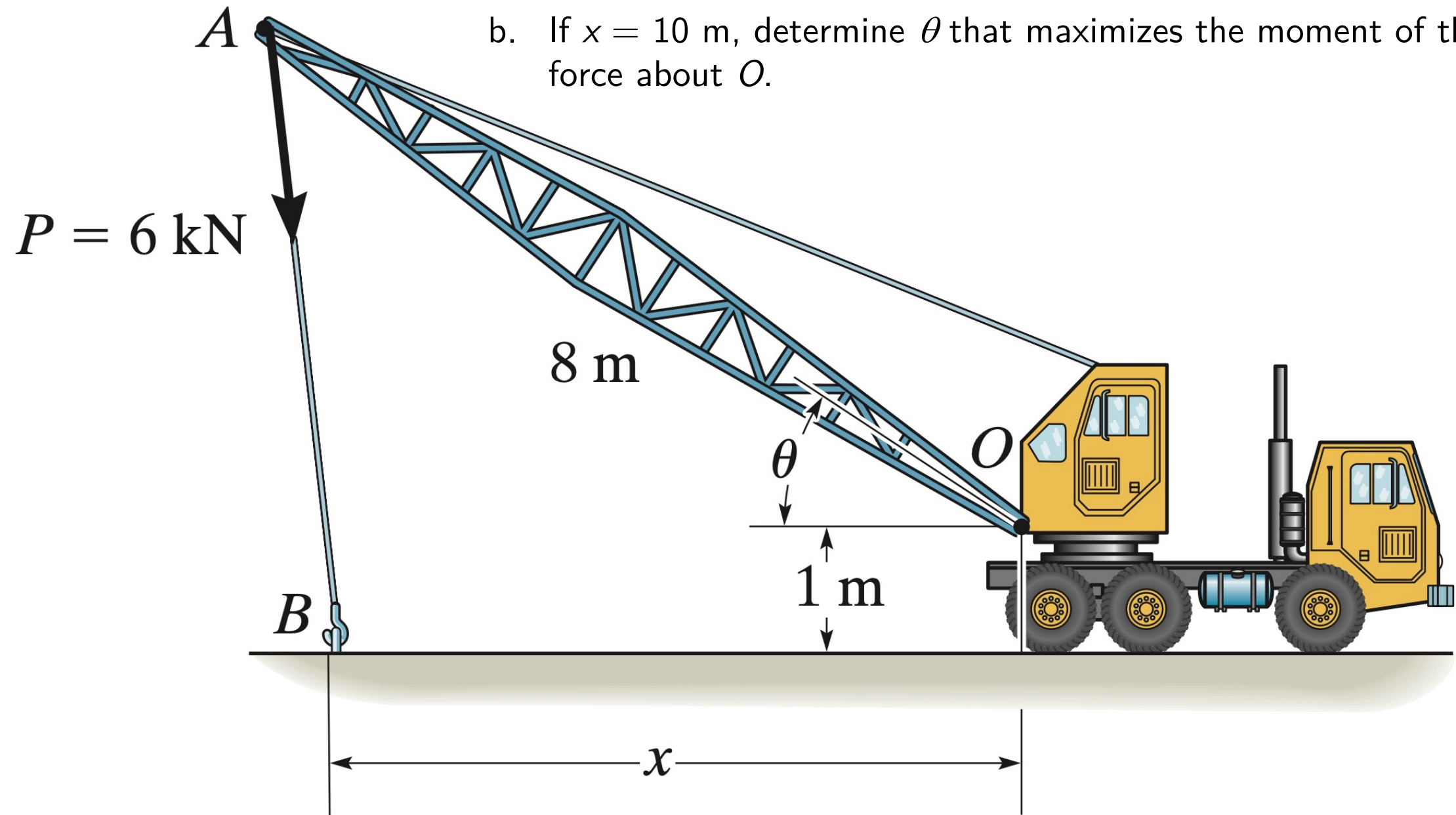


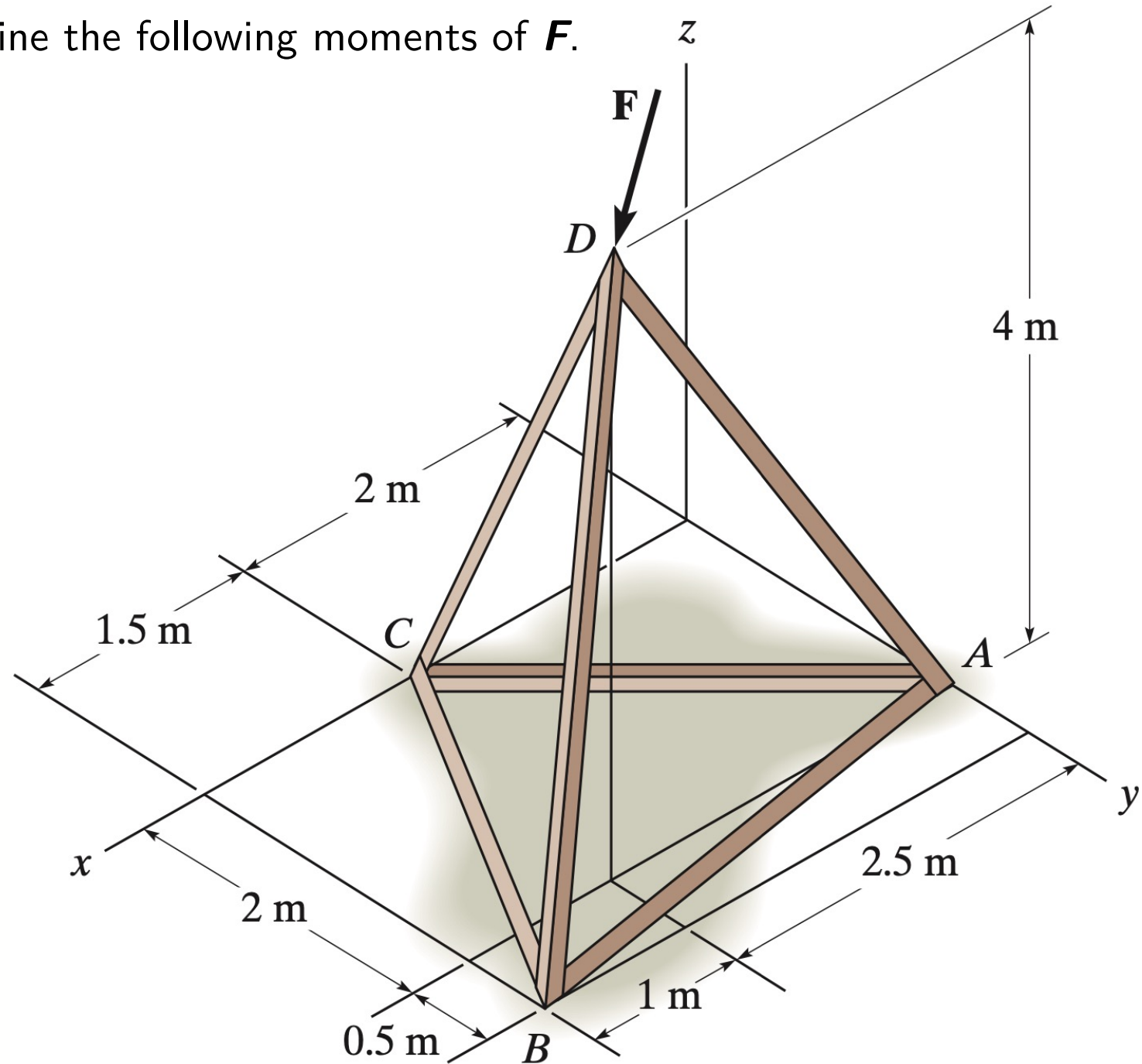
- Determine the moments of the forces about A .
- Determine the moments of the forces about B .
- Determine the total moment about A due to the forces.
- Determine the total moment about B due to the forces.

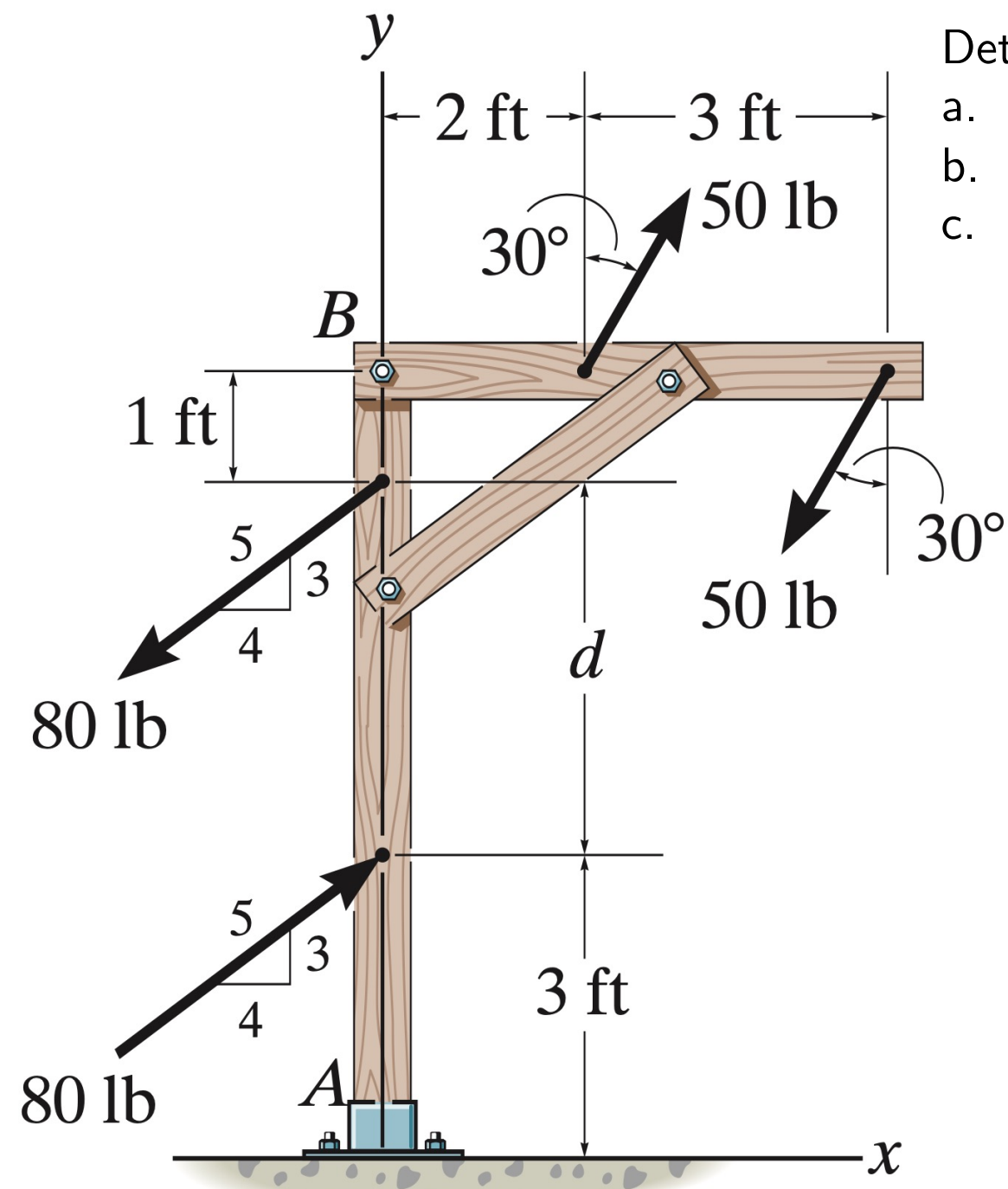
- a. If $\theta = 30^\circ$, determine x that maximizes the moment of the towline force about O .
- b. If $x = 10$ m, determine θ that maximizes the moment of the towline force about O .



Suppose $\mathbf{F} = 50\mathbf{i} - 20\mathbf{j} - 80\mathbf{k}$ N. Determine the following moments of \mathbf{F} .

- a. about A
- b. about B
- c. about C
- d. about D
- e. about AD
- f. about CD
- g. about BD
- h. about AB
- i. about CB
- j. about AC



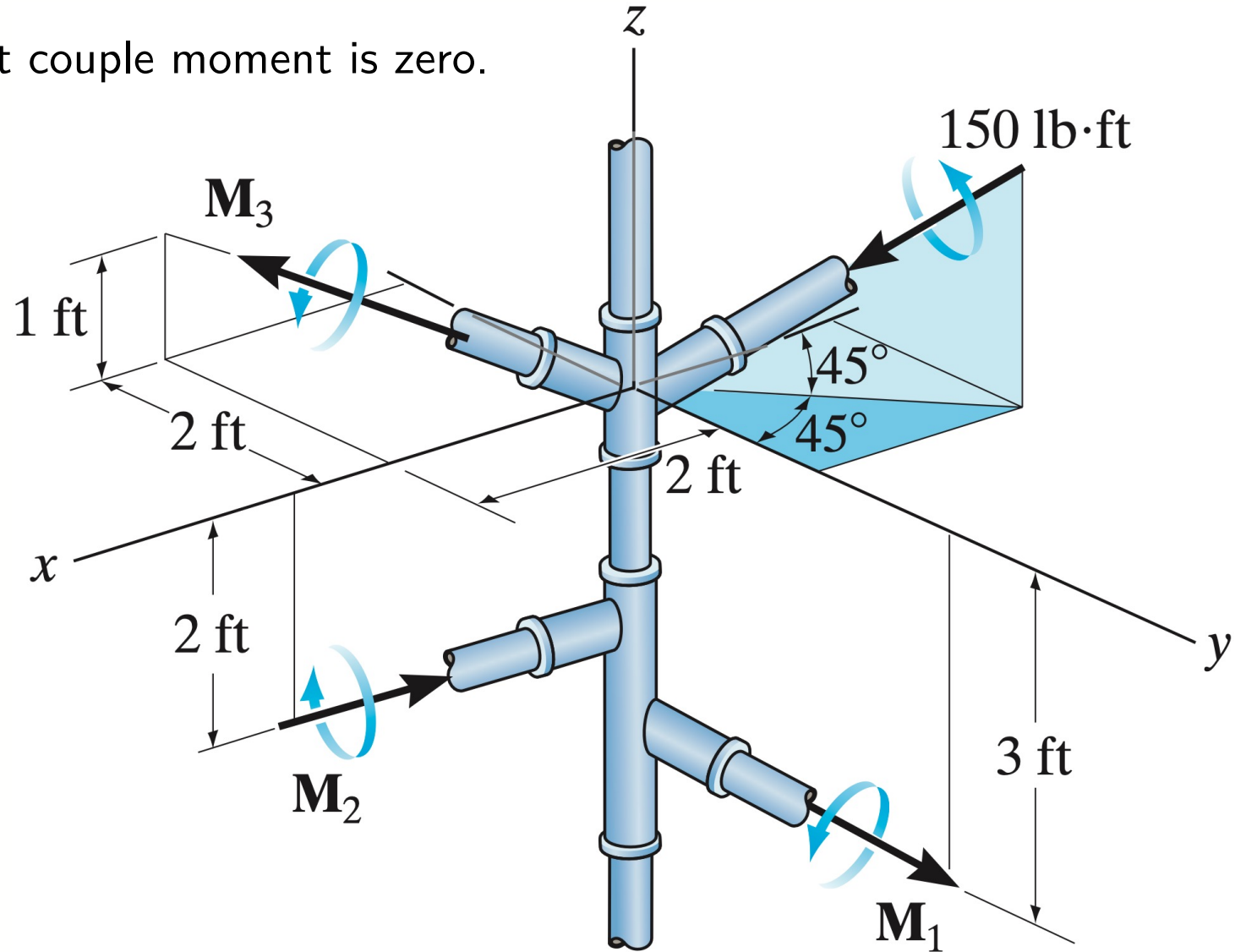


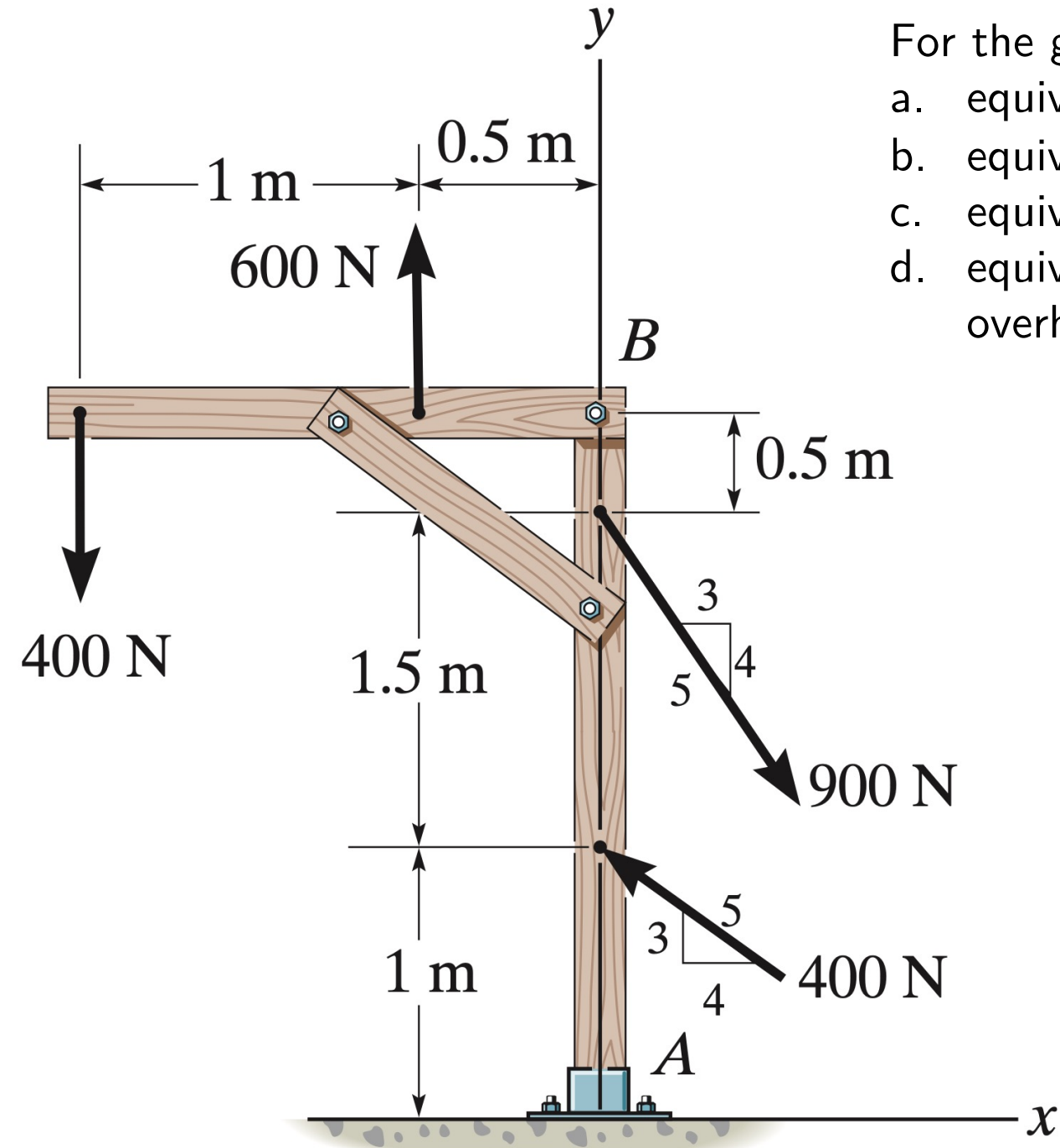
Determine the following.

- the resultant couple moment if $d = 20$ ft
- d to have a zero resultant couple moment
- the horizontal force at B to cause a zero net moment about A if $d = 20$ ft

For the four couple moments, determine:

- the magnitude and coordinate direction angles of the resultant couple moment, if $M_1 = 210 \text{ lb}\cdot\text{ft}$, $M_2 = 105 \text{ lb}\cdot\text{ft}$, and $M_3 = 140 \text{ lb}\cdot\text{ft}$; and
- M_1 , M_2 , and M_3 so that the resultant couple moment is zero.



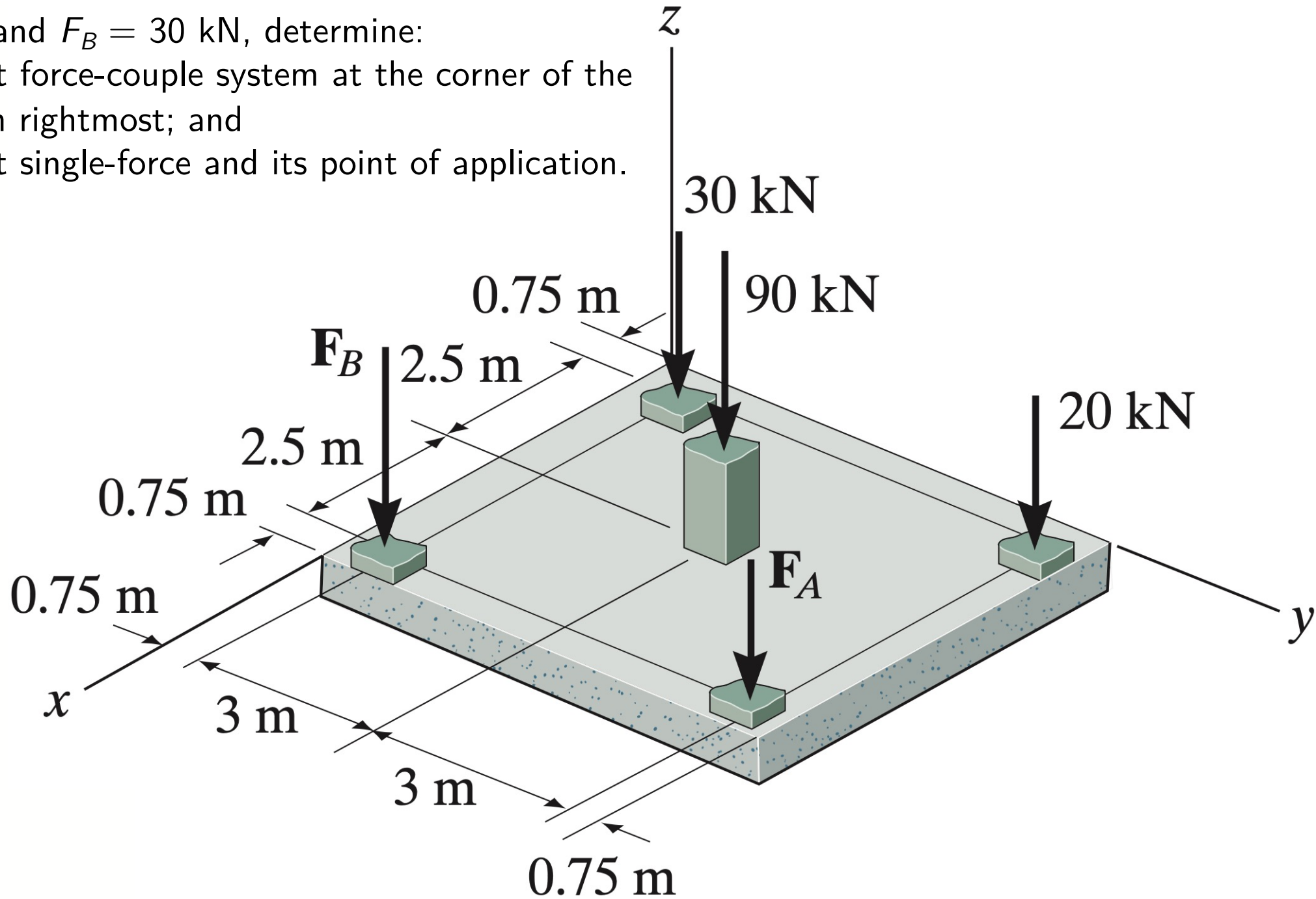


For the given loading, determine the following.

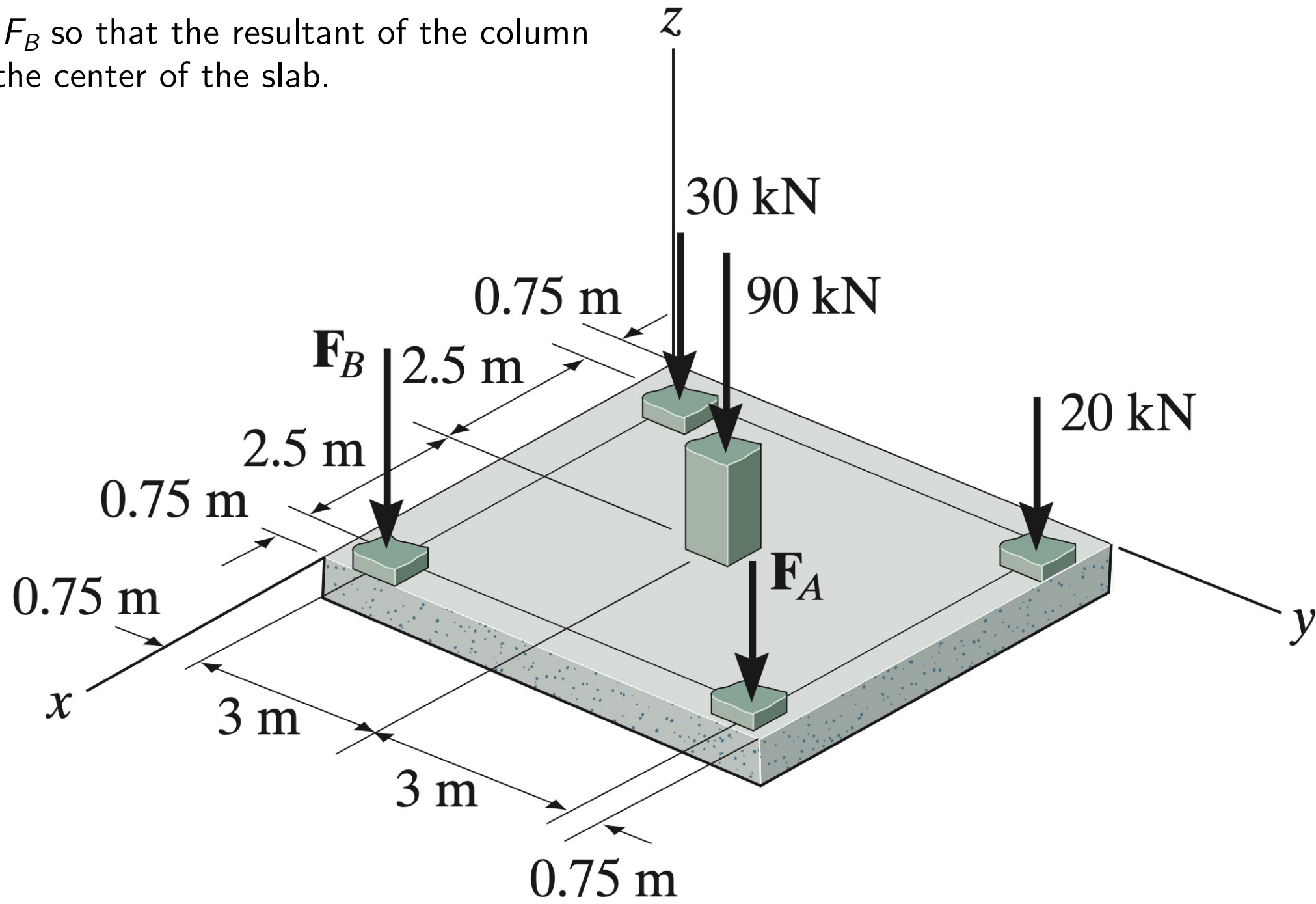
- equivalent force-couple system at A
- equivalent force-couple system at tip of overhang
- equivalent single-force and where it intersects AB
- equivalent single-force and where it intersects the overhang

For $F_A = 45$ kN and $F_B = 30$ kN, determine:

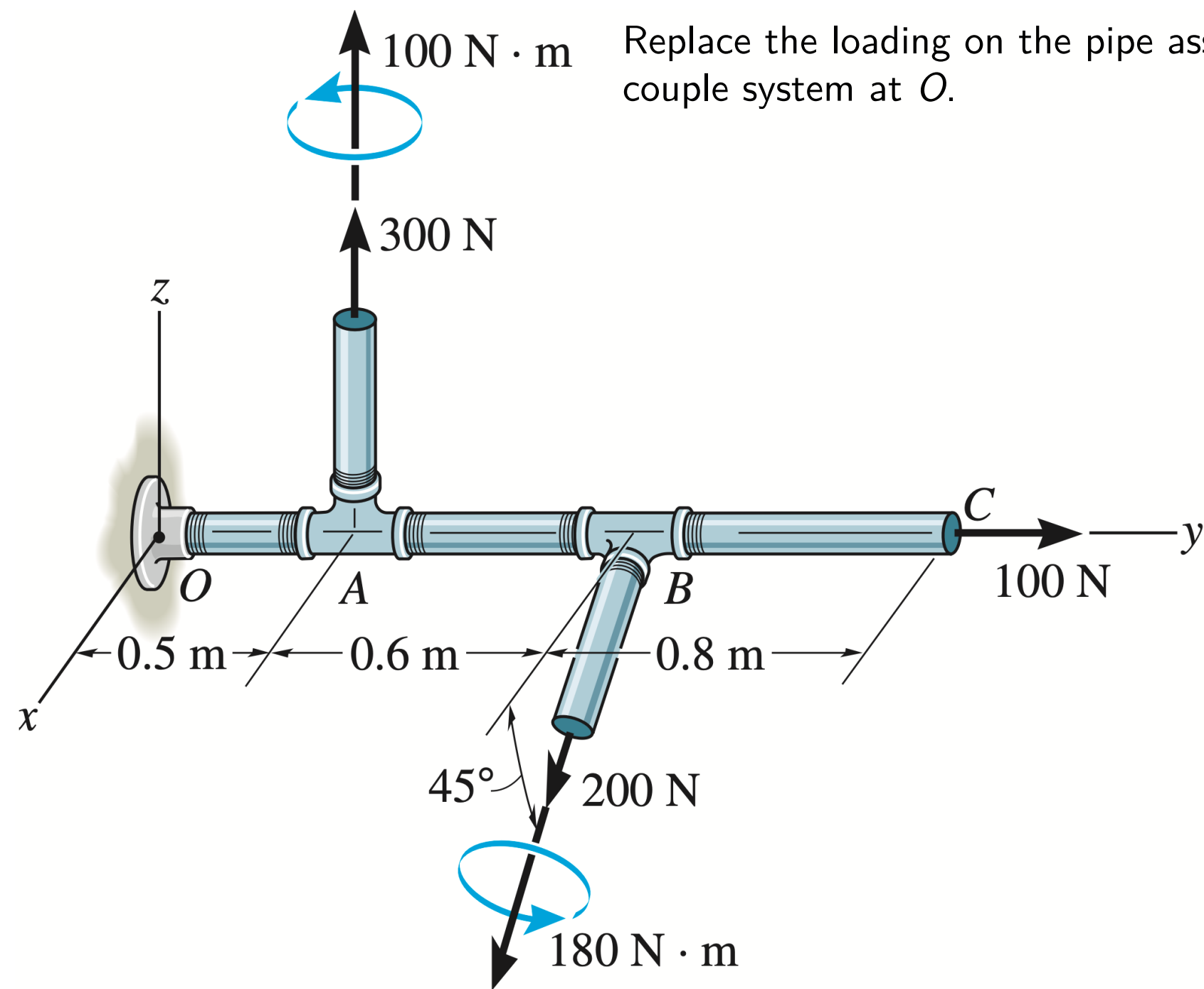
- the equivalent force-couple system at the corner of the footing shown rightmost; and
- the equivalent single-force and its point of application.



Compute F_A and F_B so that the resultant of the column loadings acts on the center of the slab.

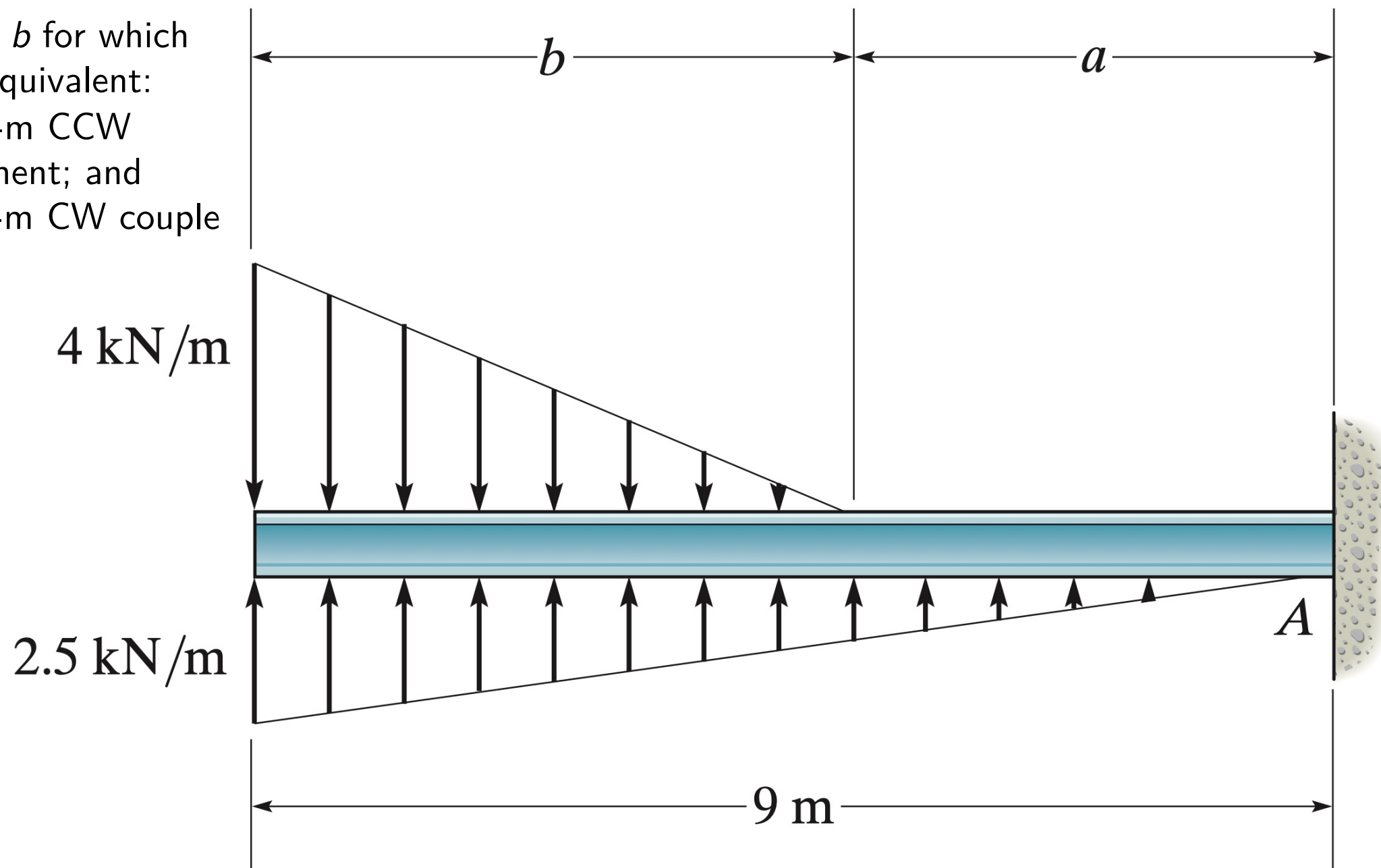


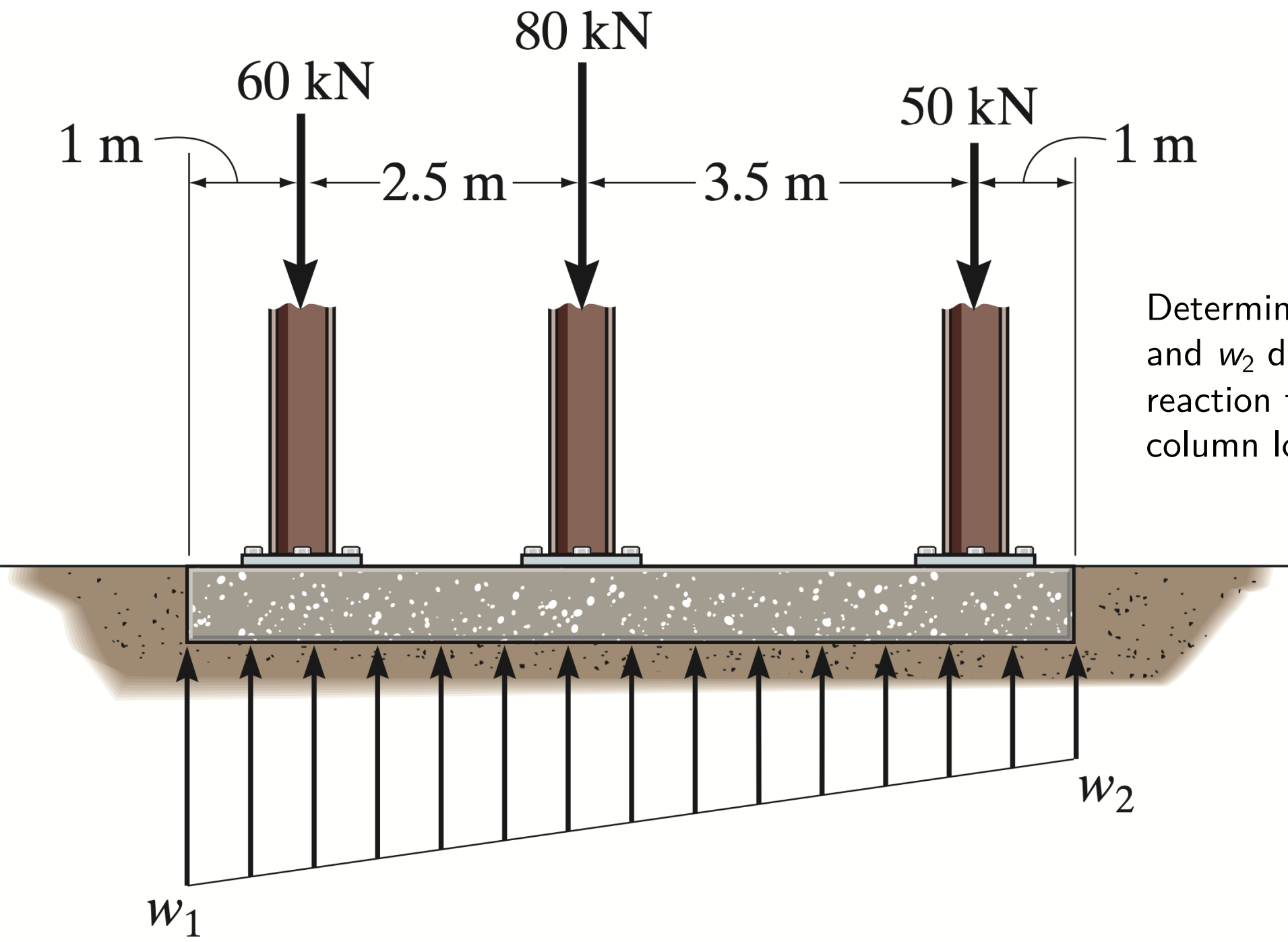
Replace the loading on the pipe assembly by an equivalent force-couple system at O .



Solve for a and b for which the loading is equivalent:

- a. to an 8-kN-m CCW couple moment; and
- b. to a 10-kN-m CW couple moment.





Determine the intensities w_1 and w_2 defining the soil reaction that supports the column loadings.