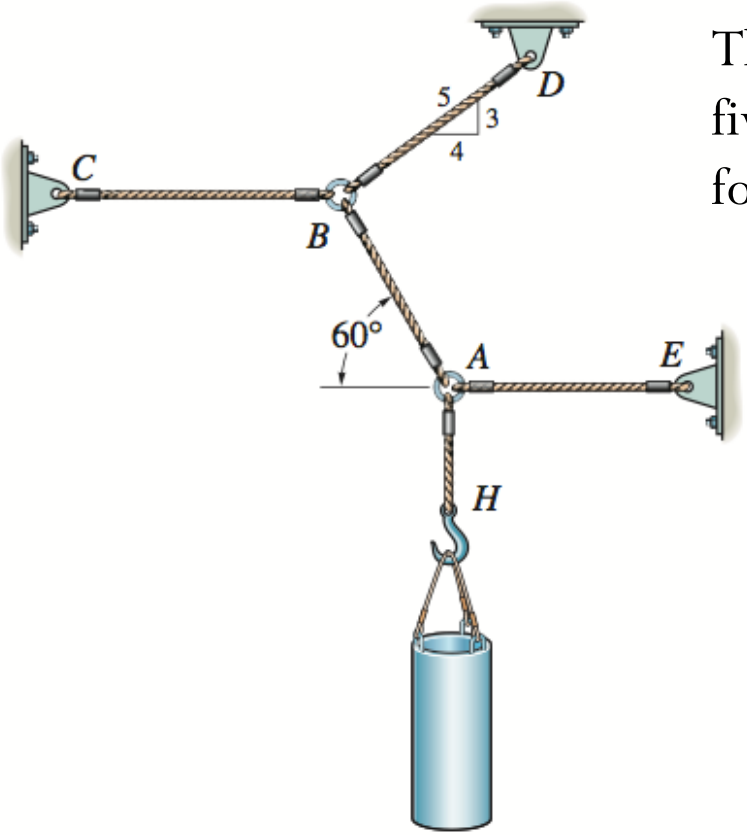
Announcements

- Sign up for next week's Quiz 2! (If you haven't already)

- Upcoming deadlines:
- Tuesday (9/19)
  - PL HW6
- Thursday (9/21)
  - ME HW7
- Friday (9/22)
  - Writing Assignment 1

What unknowns?

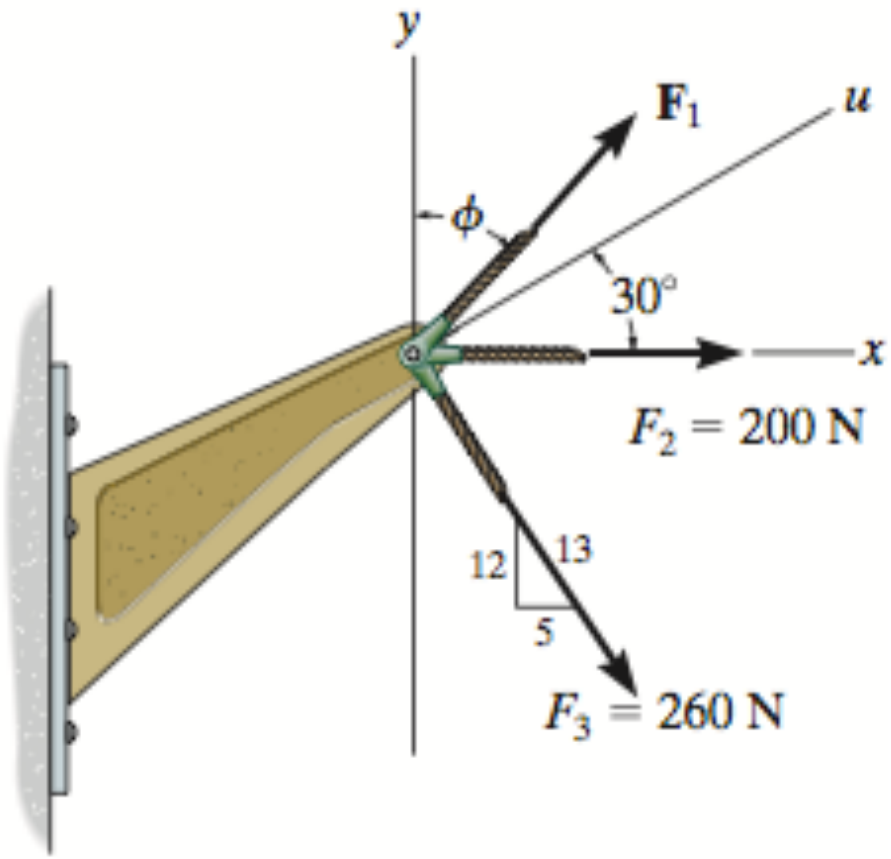


The 30-kg pipe is supported at *A* by a system of five cords. Determine the force in each cord for equilibrium.

How many unknowns are associated with this problem?

How many unknowns?

If the magnitude of the resultant force acting on the bracket is to be 450 N directed along the positive *u* axis, find $\mathbf{F}_1$.



How many unknowns are associated with this problem?

A) 1

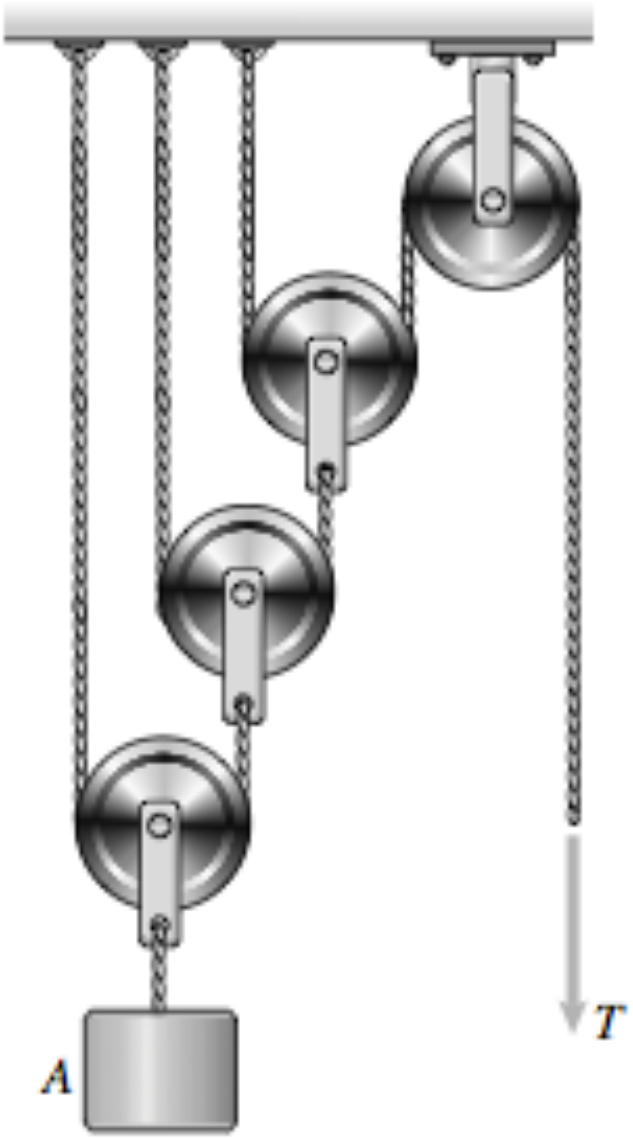
B) 2

C) 3

D) 4

E) 5

How many unknowns?



The mass of the suspended object *A* is m_A and assume the masses of all pulleys are negligible, determine the force T necessary for the system to be in equilibrium.

How many unknowns are associated with this problem?

A) 1

B) 2

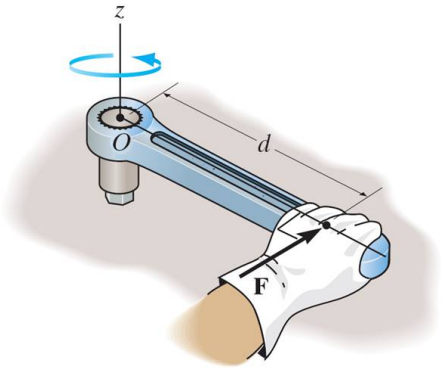
C) 3

D) 4

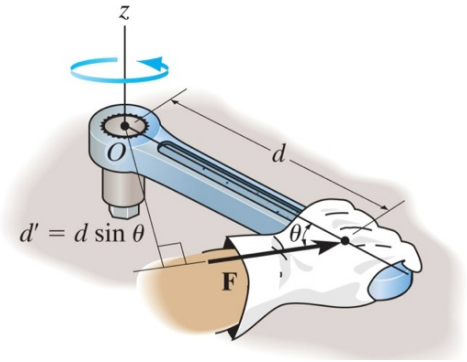
E) 5

Recap

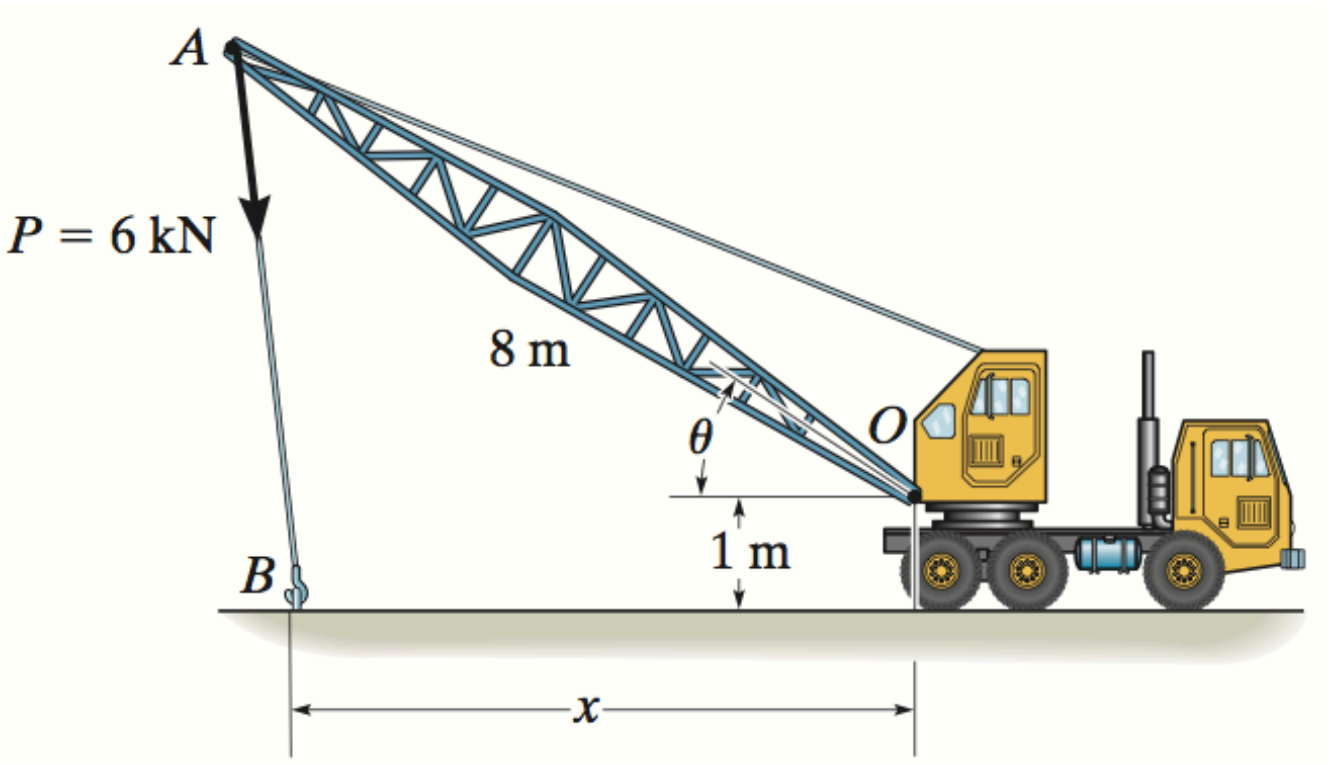
- Moment of a force
  - Scalar representation



  - Vector representation



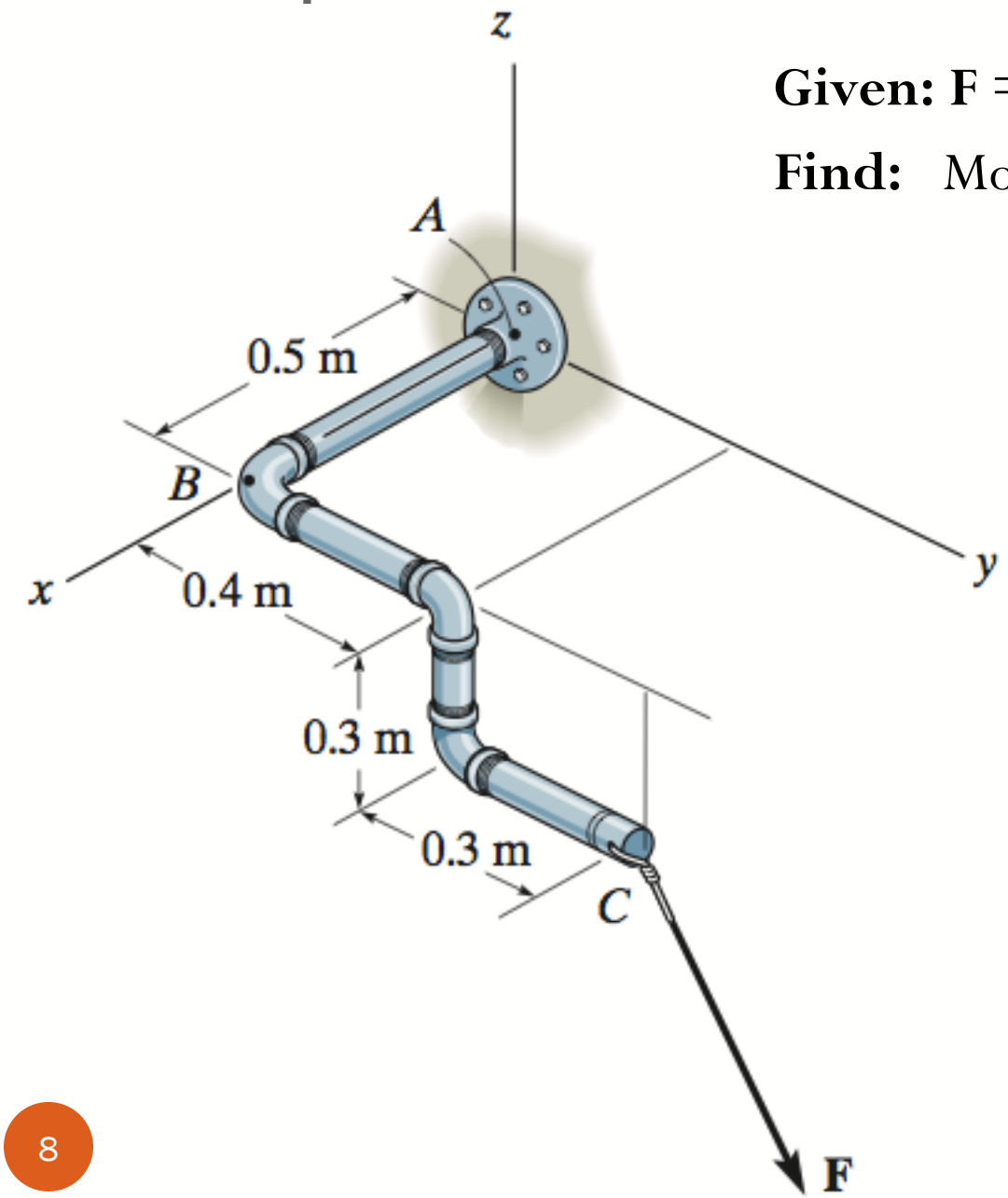
Example – Vector Formulation



Given: The angle $\theta = 30°$ and $x = 10$ m.

Find: The moment by **P** about point O.

Example – Vector Formulation

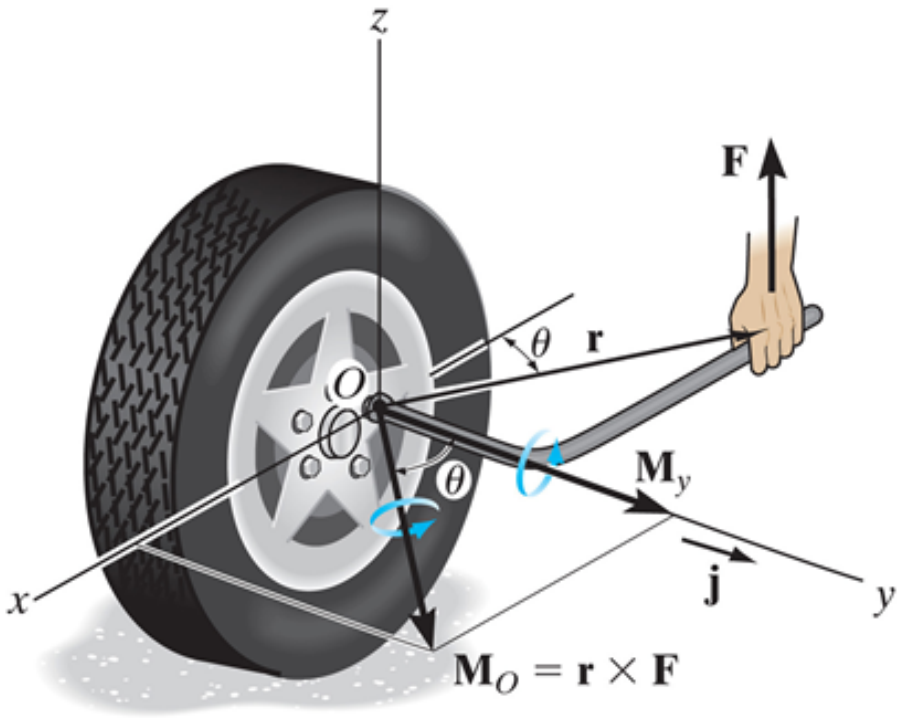


Given: $\mathbf{F} = \{600\mathbf{i} + 800\mathbf{j} - 500\mathbf{k}\}$ N

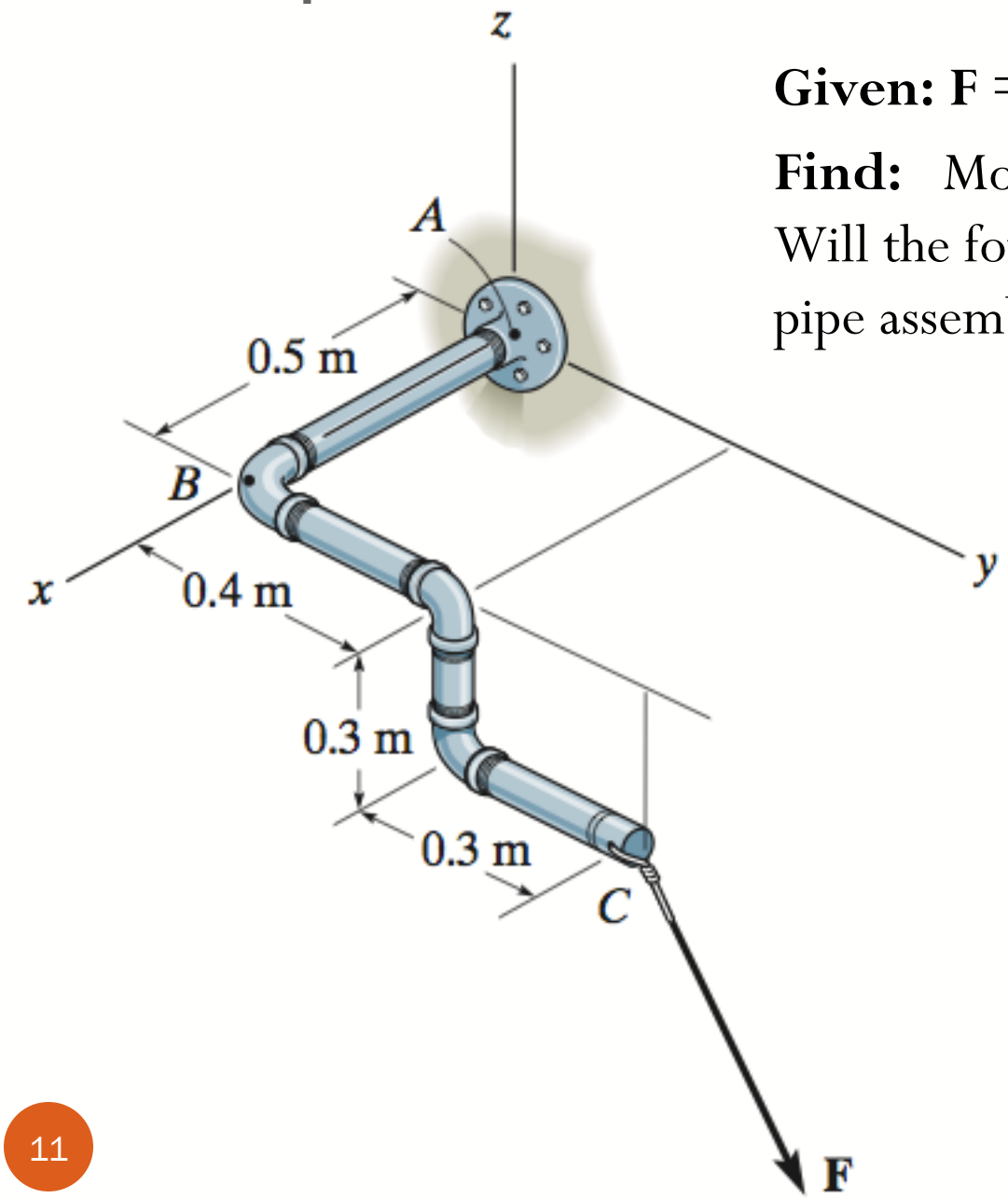
Find: Moment of the force about point *B*.

Moment about a Specific Axis

Remember, the component of a vector, **A**, along the direction of another, **B**, can be determined using the dot product:



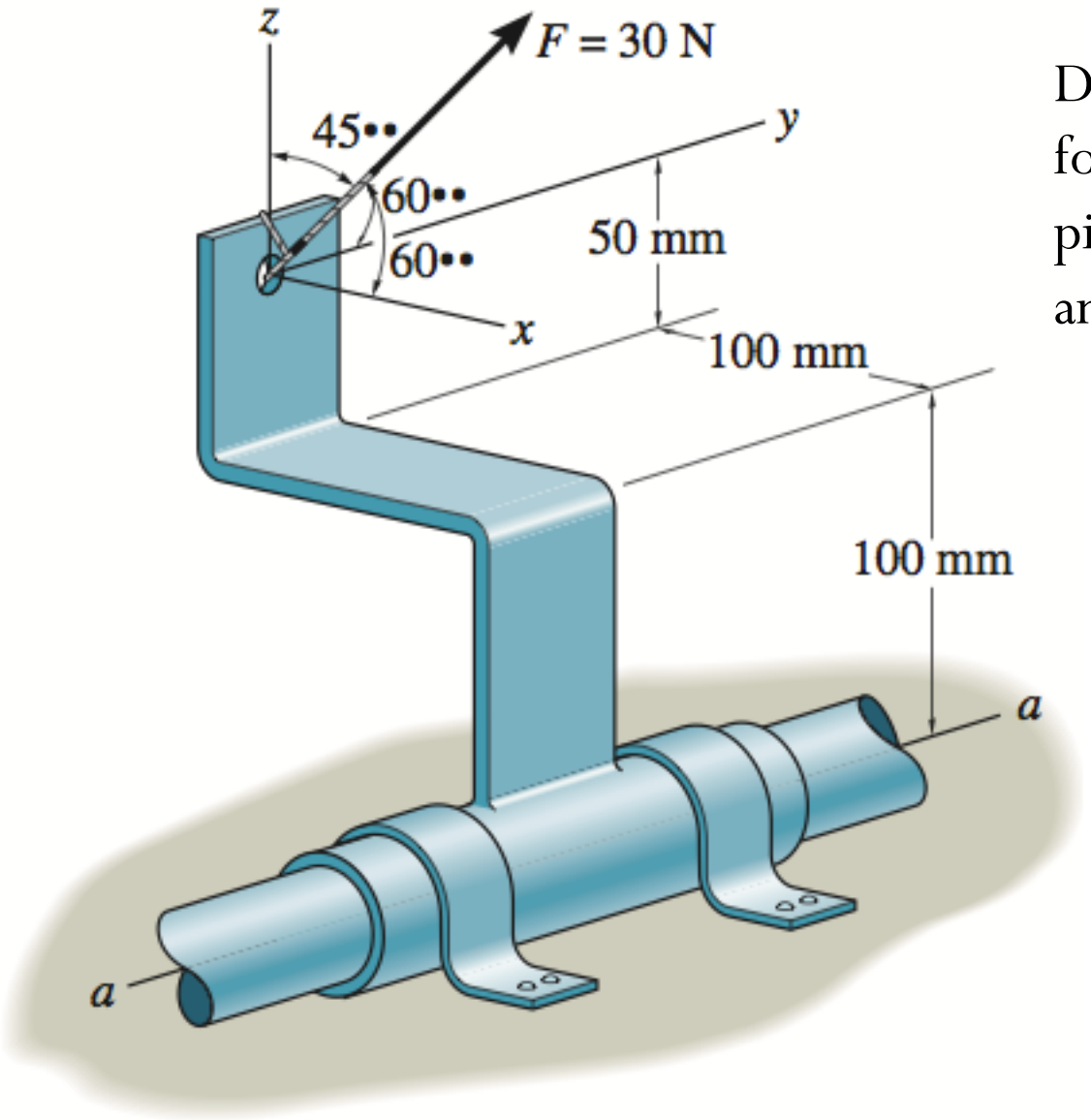
Example – Vector Formulation



Given: $\mathbf{F} = \{600\mathbf{i} + 800\mathbf{j} - 500\mathbf{k}\}$ N

Find: Moment of the force about the *x*-axis. Will the force be tightening or loosening the pipe assembly at *A*?

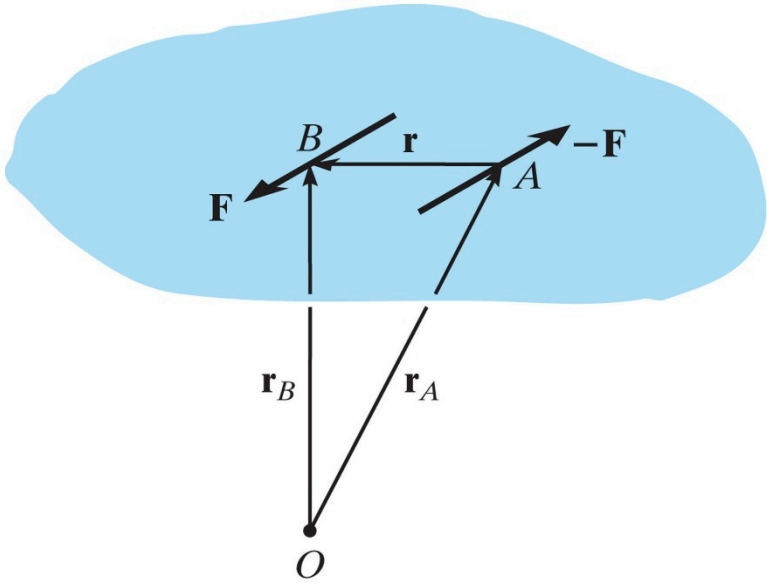
Example – Vector Formulation

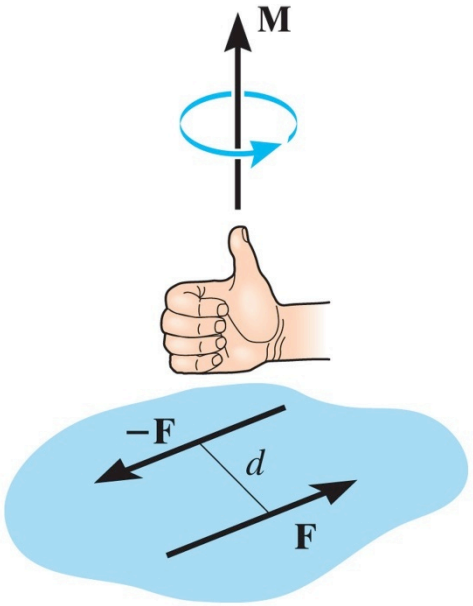


Determine the moment of the force about the *a*-*a* axis of the pipe. ($\alpha = 60°$, $\beta = 60°$, and $\gamma = 45°$)

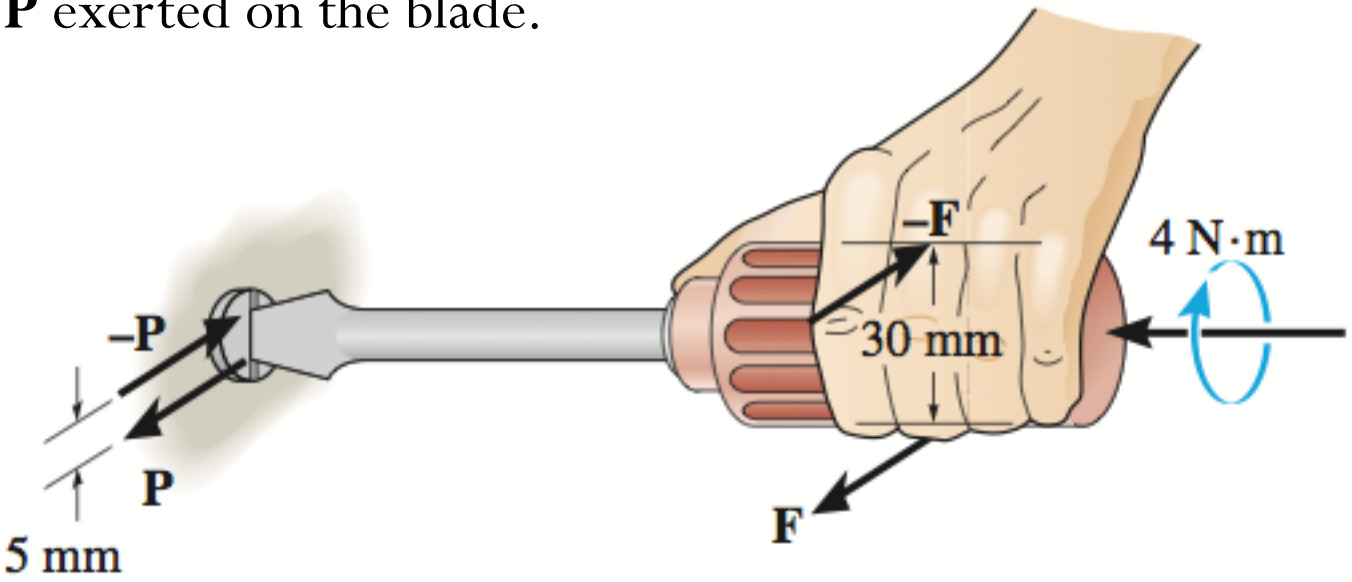
Couple Moment

Moment of a couple





A twist of 4 N-m is applied to the handle of the screwdriver. Resolve this couple moment into a pair of couple forces **F** exerted on the handle and **P** exerted on the blade.



Find the moment of the couple acting on the pipe in Cartesian vector form. What is the magnitude of the couple moment? Take F = 125 N.