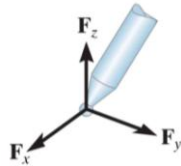


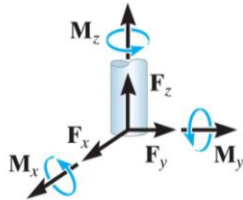
## Support Reactions in 3D



roller or smooth surface  
single  $F$  normal to surface



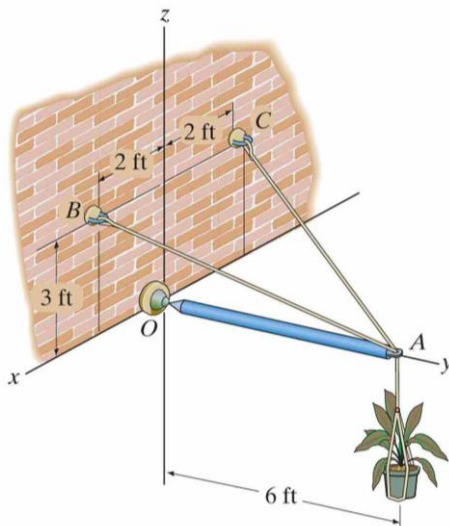
Ball-and-socket joint  
 $F_x$ ,  $F_y$  and  $F_z$



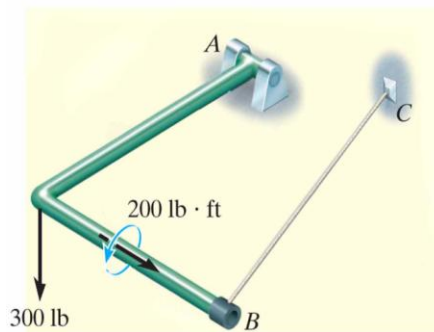
fixed support  
 $F_x$ ,  $F_y$ ,  $F_z$  and  $M_x$ ,  $M_y$ ,  $M_z$

\*more complete table in text

## FBD Example 1 in 3D

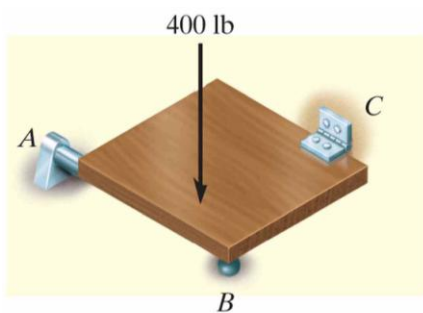


## FBD Example 2 in 3D



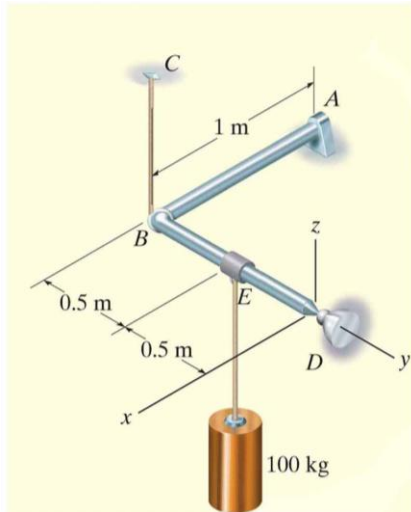
Pin at  $A$  and cable  $BC$ .

## FBD Example 3 in 3D

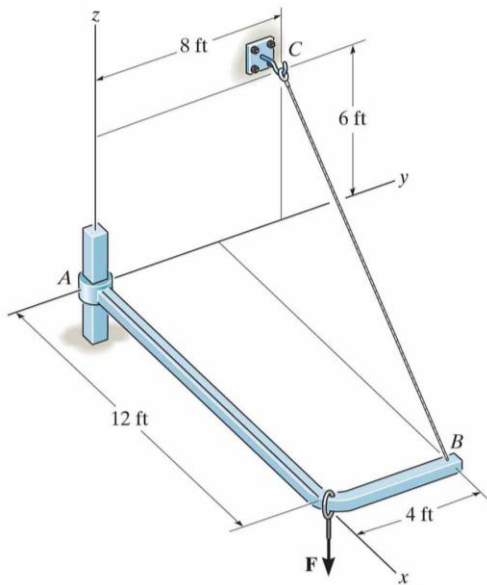


Properly aligned journal bearing at  $A$  and hinge at  $C$ . Roller at  $B$ .

### FBD Example 4 in 3D

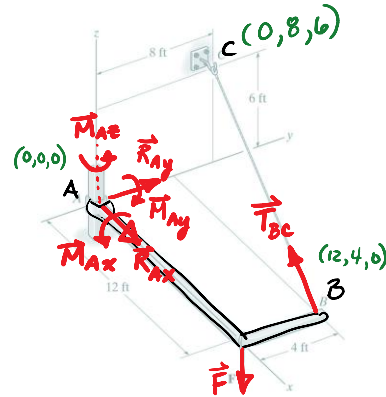


### FBD Example 5 in 2D



## FBD Example 1 in 3D

Determine the reaction forces at A and the tension in the cable, if  $F = 120\text{N}$ .



## FBD Example 2 in 3D

Determine the reaction forces at O and tension in cables AB and AC if the plant weighs 30 lb.

