

- 1.1 What are the Cartesian coordinates of point P in frame \mathcal{I} , as shown in Figure 1.5?

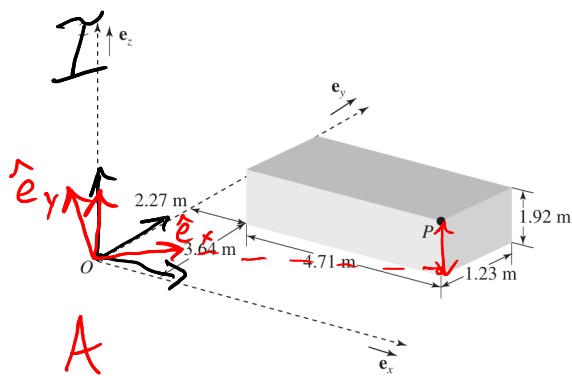


Figure 1.5 Problem 1.1.

$$\vec{r}_P = 6.98 \hat{i} + 3.64 \hat{j} + 1.92 \hat{k} \text{ m}$$

or

$$\vec{r}_P = \{6.98, 3.64, 1.92\}_{\mathcal{I}} \text{ m}$$

or

$$\vec{r}_P = \begin{bmatrix} 6.98 \\ 3.64 \\ 1.92 \end{bmatrix}_{\mathcal{I}} \text{ m} = \begin{bmatrix} \sqrt{7^2 + 4^2} \\ 0 \\ 1.92 \end{bmatrix}_{\mathcal{A}} \text{ extra}$$

- 1.2 Sketch and label the vectors $\vec{r}_{P/O}$, $\vec{r}_{P/Q}$, $\vec{r}_{Q/P}$ in Figure 1.6.

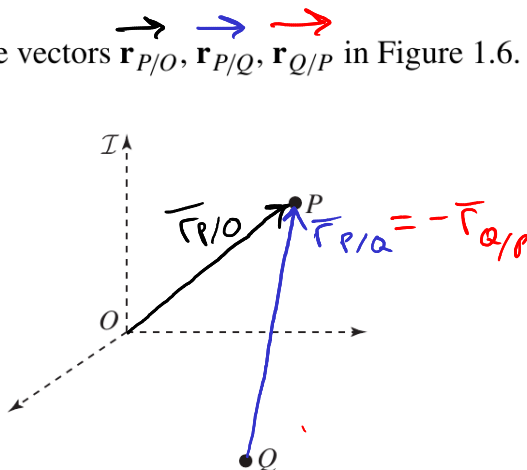


Figure 1.6 Problem 1.2.

$$\vec{r}_{P/O} \equiv \text{position of } \underline{P} \text{ with respect to } \underline{O}$$

Draw the FBD of barbells



Figure 2.14 Problem 2.6. Image courtesy of Shutterstock.

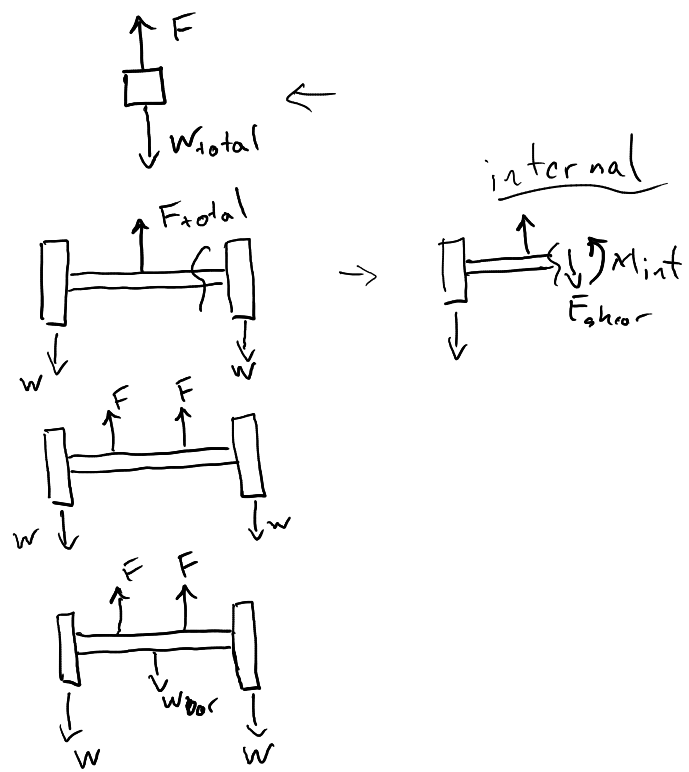
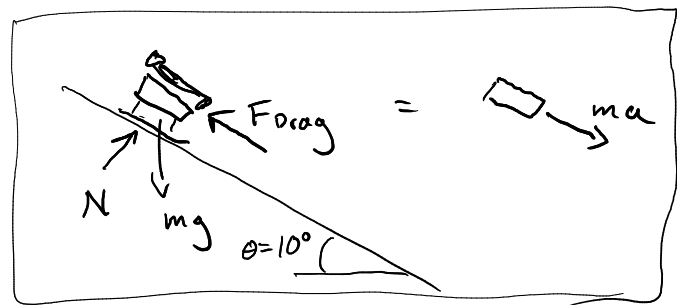
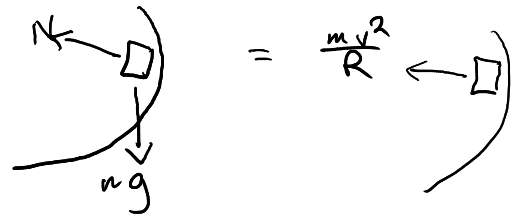


Figure 2.13 Problem 2.5. Image courtesy of Shutterstock.



eom

$$mg \cos \frac{\pi}{18} - F_{\text{drag}} = ma$$

$$g \cos \frac{\pi}{18} - \frac{1}{2} C_D A \rho v^2 = a$$