

H.W. # 4

**Due** on Tuesday 13-11-1429 / 11-11-2008 (any time)

**Deadline** for submission: **Wednesday 14-11-1429 / 12-11-2008 (before you sit in class)**

1- As shown in Fig. P1, the 100-lb slider at A is held in place on the smooth circular bar by the cable AB. The circular bar is contained in the  $x$ - $y$  plane. [Sec. 3.4] (20 pts.)

- (a) Determine the tension in the cable.
- (b) Determine the normal force exerted on the weight by the bar.

2- The force  $F$ , shown in Fig. P2, exerts a 200 ft-lb counterclockwise moment about  $A$  and a 100 ft-lb clockwise moment about  $B$ . What are  $F$  and  $\theta$ ? [Sec. 4.1] (15 pts.)

3- (i) Determine the moment of the 80-N force shown in Fig. P3 about the origin  $O$  by using [Secs. 4.1 - 4.4] (20 pts.)

- (a) the scalar method,
- (b) the cross product, letting  $\mathbf{r}$  be the vector from  $O$  to  $A$ ,
- (c) the cross product, letting  $\mathbf{r}$  be the vector from  $O$  to  $B$ .

(ii) What is the two-dimensional description of the moment?

4- The tension in cable  $AB$ , shown in Fig. P4, is 150 N. The tension in cable  $AC$  is 100 N. Determine the sum of the moments about  $D$  due to the forces exerted on the wall by the cables by

- (a) using the vector  $\mathbf{DA}$  for both forces,
- (b) using the vector  $\mathbf{DB}$  for  $T_{AB}$  and the vector  $\mathbf{DC}$  for  $T_{AC}$ ,
- (c) first finding the resultant force,  $\mathbf{R}$ , then finding  $\mathbf{M}$  of  $\mathbf{R}$ .

Compare the results and comment.

[Secs. 4.1 - 4.4] (25 pts.)

5- The tension in cable  $AB$ , shown in Fig. P5, is 80 lb. What is the moment about the line  $CD$  due to the force exerted by the cable on the wall at  $B$ ? [Sec. 4.5] (20 pts.)

**Solve the problem four times by using four different position vectors**, and compare your answers.

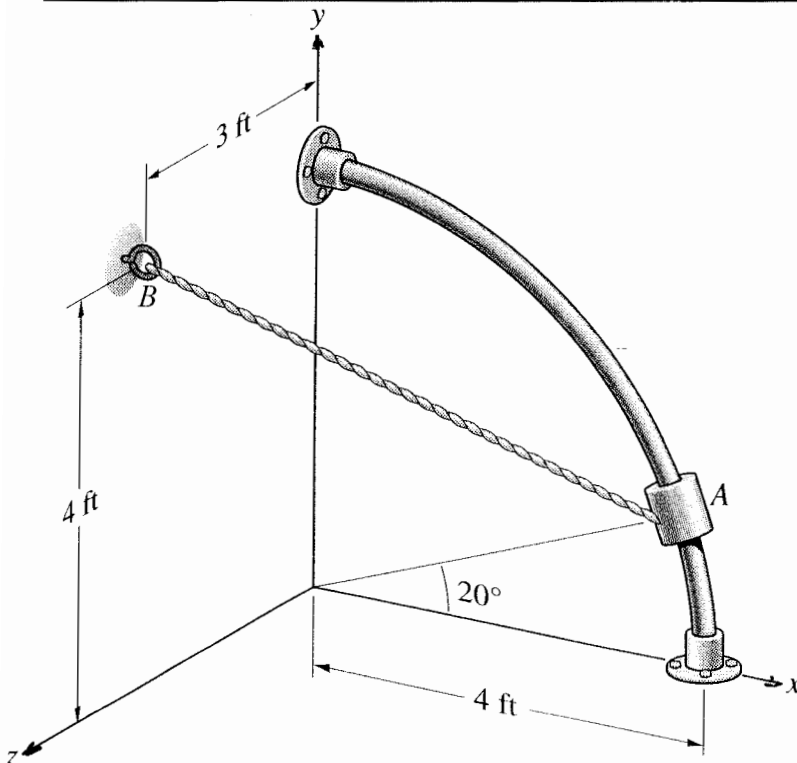


Fig. P1

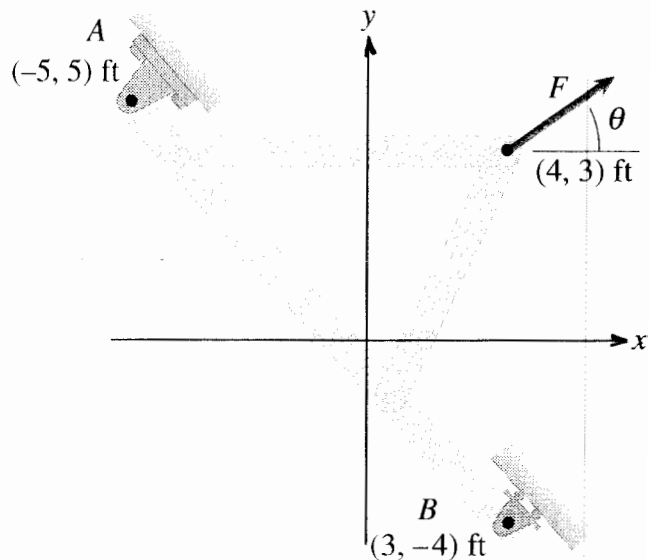


Fig. P2

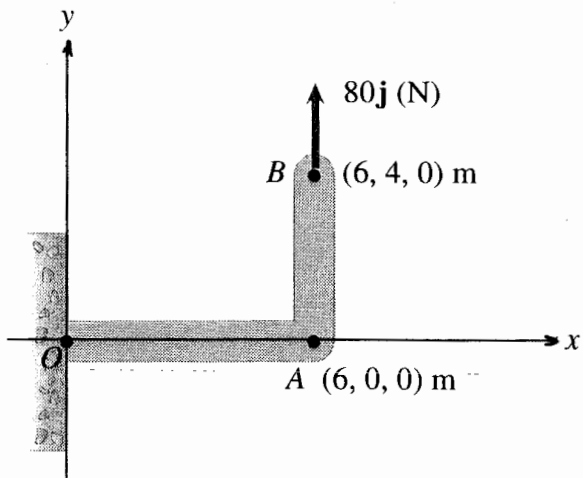


Fig. P3

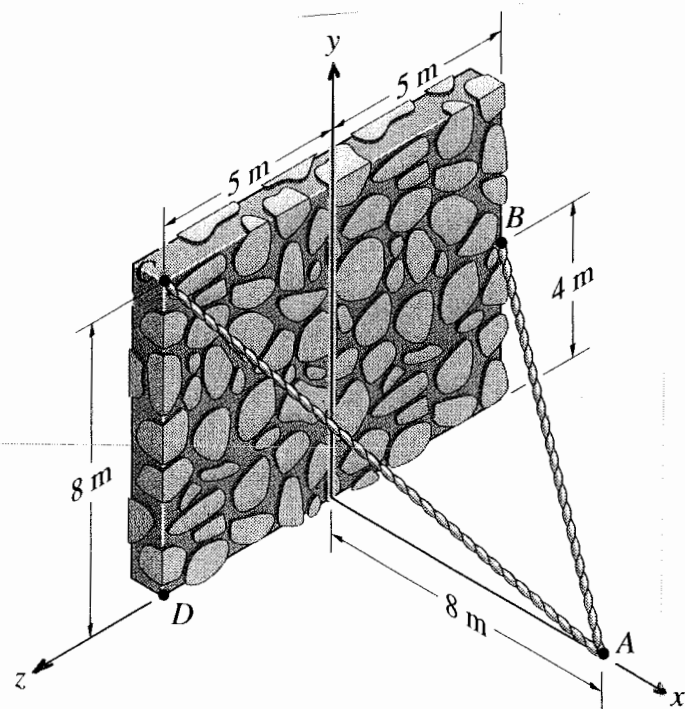


Fig. P4

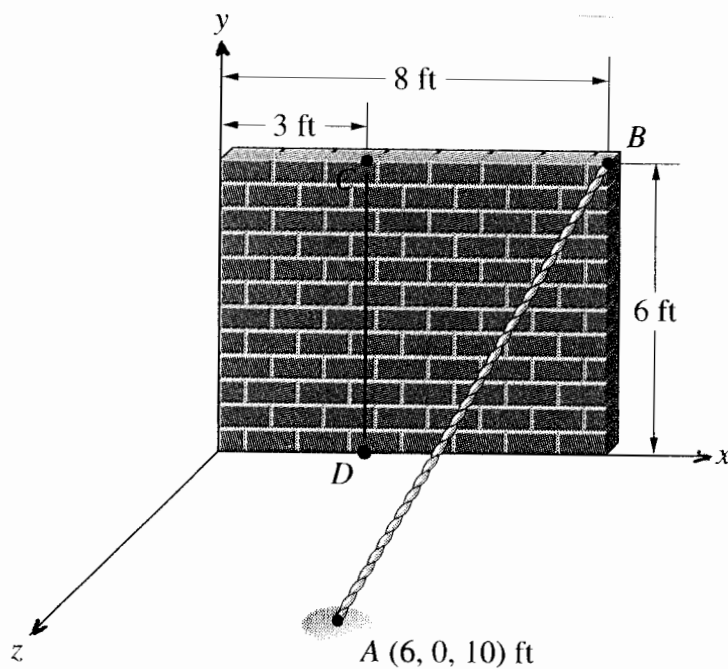


Fig. P5

**Do your work *yourself*!!** Remember that the homework carries about 15% of the course grade; in addition, *solving it is the best way to understand the subject.* Of course, you can seek my help anytime in the homework as well as in anything else.

As an *engineer*, review the guidelines for submitting homework assignments given to you in class **BEFORE** you start solving and writing the homework. **FOLLOW ALL THESE GUIDELINES.** Cheating, copying, etc. is .....!!!!!!