

NAME: _____ Lab section/Lab time: _____

MECH 2110 Exam 1

1. The coordinates of the points A , B , C , and D are given (the units are ft):
 $A(x_A = 0, y_A = 8, z_A = 0)$, $B(x_B = 0, y_B = 5, z_B = 0)$, $C(x_C = -7, y_C = -7, z_C = 0)$,
 and $D(x_D = 6, y_D = 6, z_D = 0)$. Find: the vectors \vec{AB} and \vec{CD} ; the projection of the vector
 \vec{AB} on the vector \vec{CD} ; the angle between \vec{AB} and \vec{CD} (3p)

2. Determine the moment of inertia about the x -axis of the shaded area shown in Fig. P2 where $m = h/b$ and $b = h = 1$ m. Use integration. (2p)

3. Determine the force in each member of the truss shown in Fig. P3. Note the presence of any zero-force members. The force at B is $F = 1$ kip and $a = 4$ ft. (3p)

4. The uniform ladder of weight $W = 25$ lb rests at A on the rough floor for which the coefficient of static friction is $\mu_s = 0.3$ and against the smooth wall at B as shown in Fig. P4. Determine the horizontal force P required to start the ladder to slide. The force P is applied to the middle of the ladder and $a = 5$ ft, $b = 24.5$ ft. (2p)

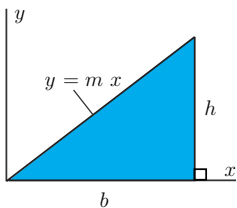


Fig. P2: Problem 2

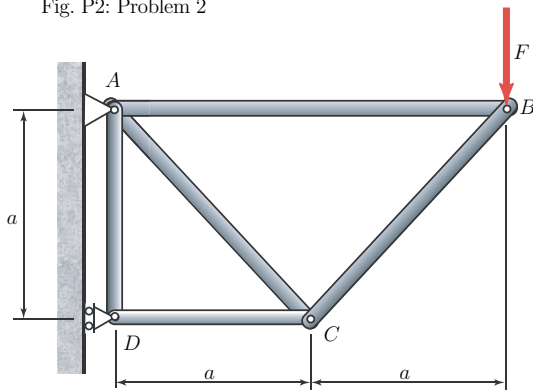


Fig. P3: Problem 3

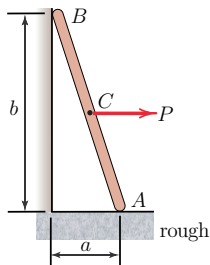


Fig. P4: Problem 4