

Homework III - Chapter 5

due Friday, 04/29/11, 12:50pm, 370-370

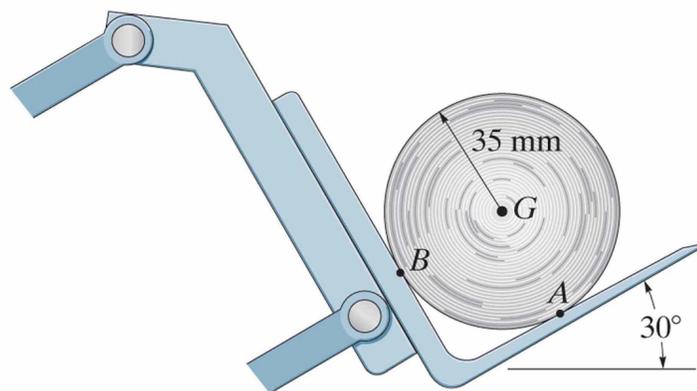
For late homework, you are responsible to arrange drop off with our grader Kaushik Mani, kmani@stanford.edu. Once you have used up your three late days, you will no longer receive points for your homework. Here are our office hours and emails.

when	when	where	who	email
Tuesdays	06:00 - 07:30pm	Durand 247	Charbel	ceid@stanford.edu
Wednesdays	02:30 - 04:00pm	Durand 217	Ellen	ekuhl@stanford.edu
Wednesdays	05:00 - 06:30pm	Durand 393	Chris	cploch@stanford.edu
Thursdays	10:00 - 11:30am	Durand 203	Joules	jmgould@stanford.edu
Thursdays	01:00 - 02:30pm	Durand 393	Estevan	estevanm@stanford.edu

For this homework, you need to be familiar with chapter 5 of your book!

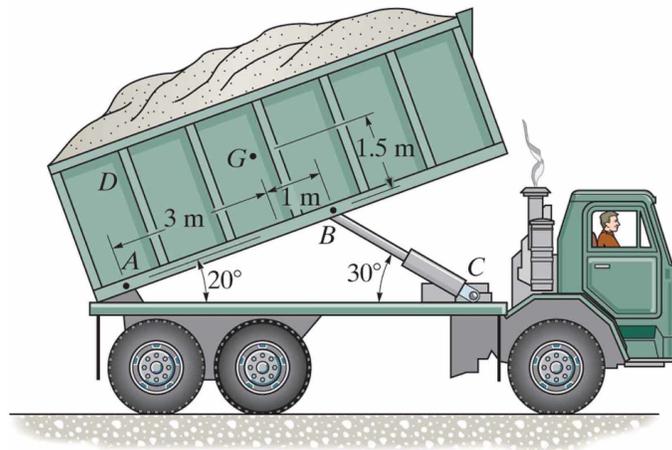
Remember, all solutions must include a free body diagram!

Problem 1



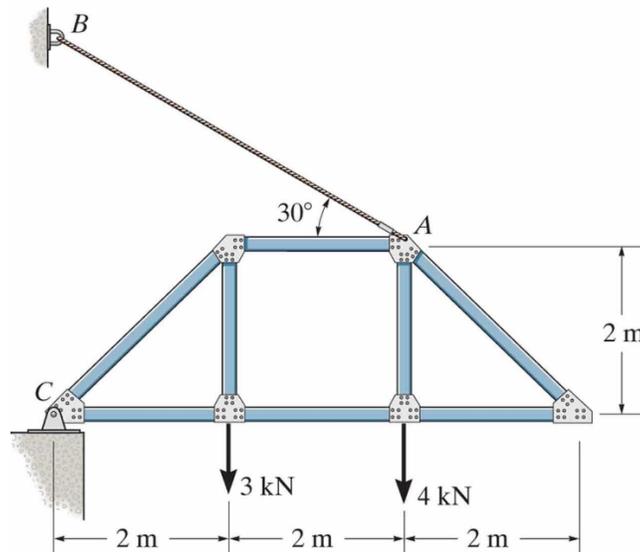
- 1.1 Draw the free body diagram of the 50 kg paper roll which has a center of mass at G and rests on the smooth blade of the paper hauler.
- 1.2 Explain the significance of each force acting on the diagram.
- 1.3 Determine the normal reaction forces at A and B .
- 1.4 Control your force equilibrium with a graphic analysis using vector addition.

Problem 2



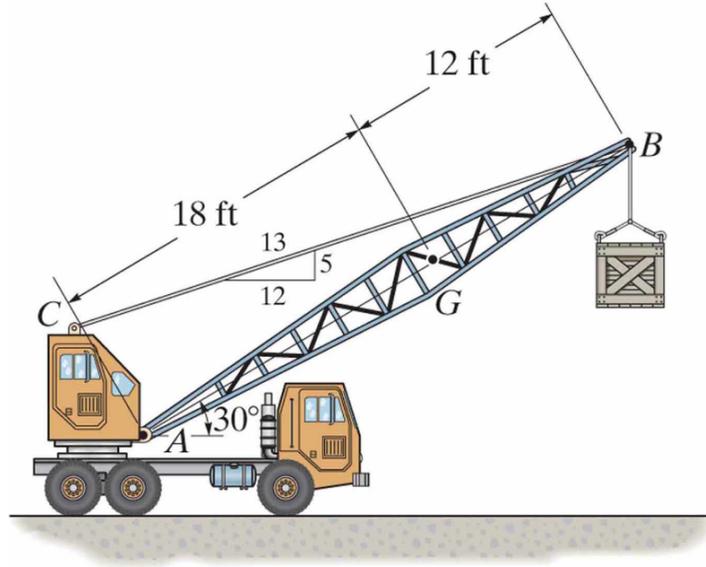
- 2.1 Draw the free body diagram of the dumpster of the truck, which has a weight of 5000 kg (not lb) and a center of gravity at G . It is supported by a pin at A and a pin-connected hydraulic cylinder BC acting as a short link.
- 2.2 Explain the significance of each force acting on the diagram.
- 2.3 Determine the reaction forces at A and the force in the short link BC .
- 2.4 Control your force equilibrium with a graphic analysis using vector addition.

Problem 3



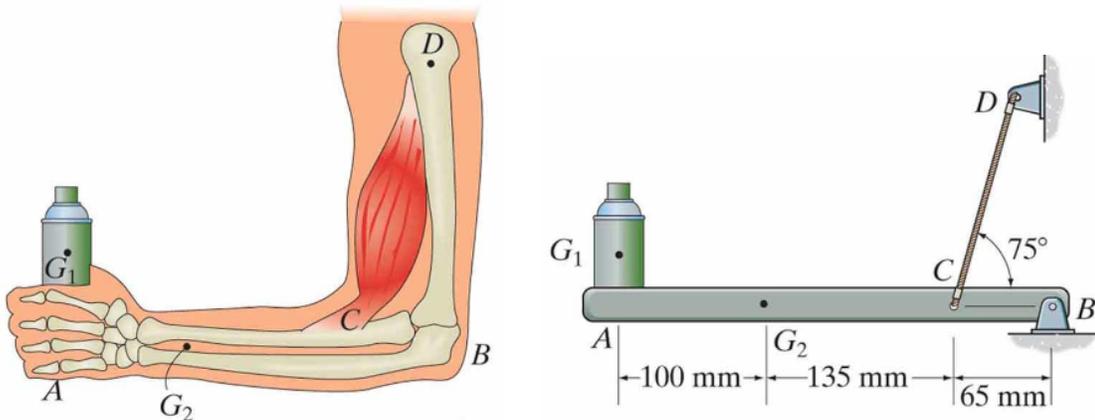
- 3.1 Draw the free body diagram of the truss that is supported by the cable AB and by the pin C .
- 3.2 Explain the significance of each force acting on the diagram.
- 3.3 Determine the reaction forces at C and the tension in the cable AB .
- 3.4 Control your force equilibrium with a graphic analysis using vector addition.

Problem 4



- 4.1 Draw the free body diagram of the crane boom AB which has a weight of 650 lb and a center of gravity at G . The boom is supported by a pin at A and a cable at BC . The load of 1250 lb is suspended from a cable attached at B .
- 4.2 Explain the significance of each force acting on the diagram.
- 4.3 Determine the reaction forces at A and the tension in the cable BC .
- 4.4 Control your force equilibrium with a graphic analysis using vector addition.

Problem 5



A skeletal diagram of a hand holding a load is shown in the left figure. The corresponding structural system is shown on the right. If the load and the forearm have masses of $m_1 = 2\text{kg}$ and $m_2 = 1.2\text{kg}$, respectively, and their centers of mass are located at G_1 and G_2 , determine the force developed in the biceps CD and the horizontal and vertical components of reaction at the elbow joint B .

