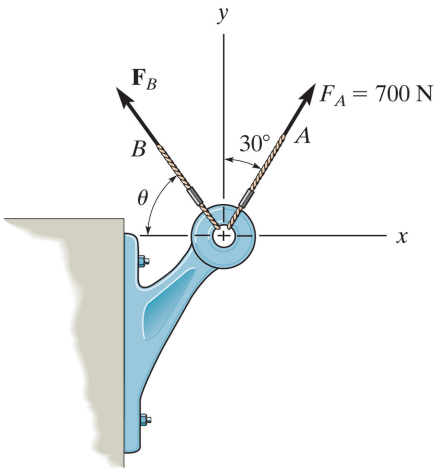
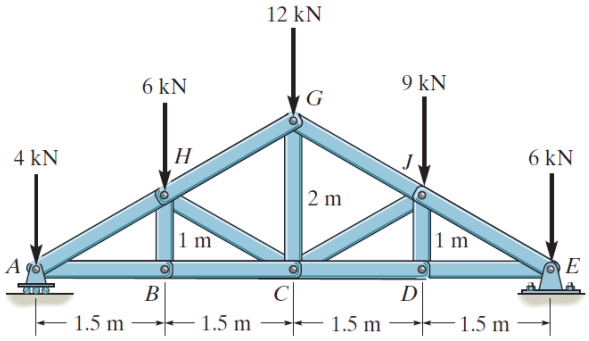
Exercise 1.

Determine the magnitude and orientation θ of $\mathbf{F}_B$ so that the resultant force is directed along the positive y-axis and has a magnitude of 1500 N. **(10pts)**



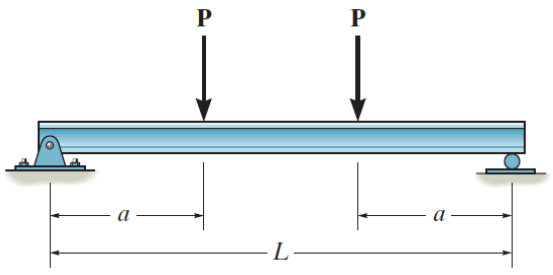
Exercise 2.

Determine the force in members BC, HC, and HG. State if these members are in tension or compression. **(20pts)**



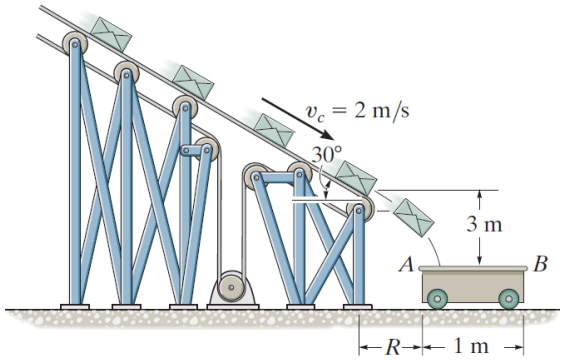
Exercise 3.

Draw the shear and moment diagrams for the beam. Set $P = 20\,\text{kN}$, $a = 1.5\,\text{m}$, $L = 6\,\text{m}$. **(20pts)**



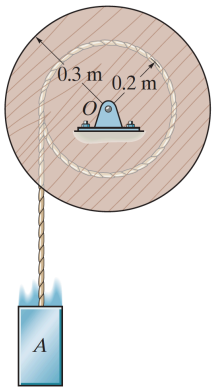
Exercise 4.

Small packages traveling on the conveyor belt fall off into a 1-m-long loading car. If the conveyor is running at a constant speed of $v_c = 2\,\text{m/s}$, determine the smallest and largest distance R at which the end A of the car may be placed from the conveyor so that the packages enter the car. **(10pts)**



Exercise 5.

The spool has a mass of 50 kg and a radius of gyration of $k_O = 0.280\,\text{m}$. If the 20-kg block A is released from rest, determine the velocity of the block when it descends 0.5 m. **(20pts)**



Exercise 6.

If the flywheel is rotating with an angular velocity of $\omega_A = 6\,\text{rad/s}$, determine the angular velocity of rod BC at the instant shown. **(20pts)**