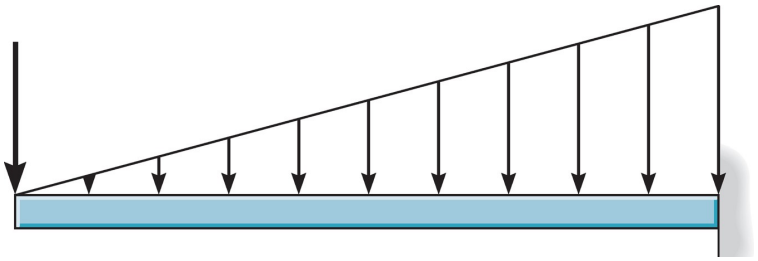
Name:

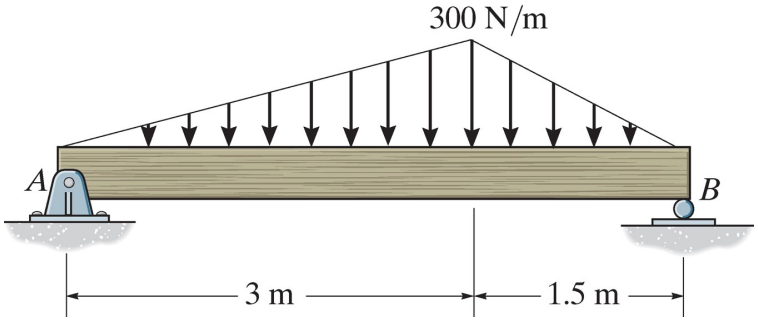
Homework 5

Due 8 October 2021

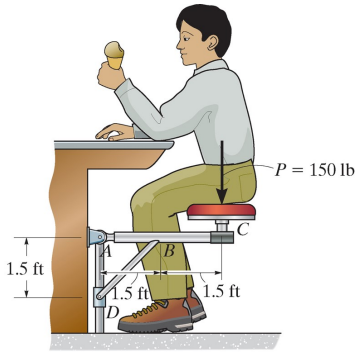
1. Draw a free-body diagram of the beam and sketch the general shape of the shear-moment diagram



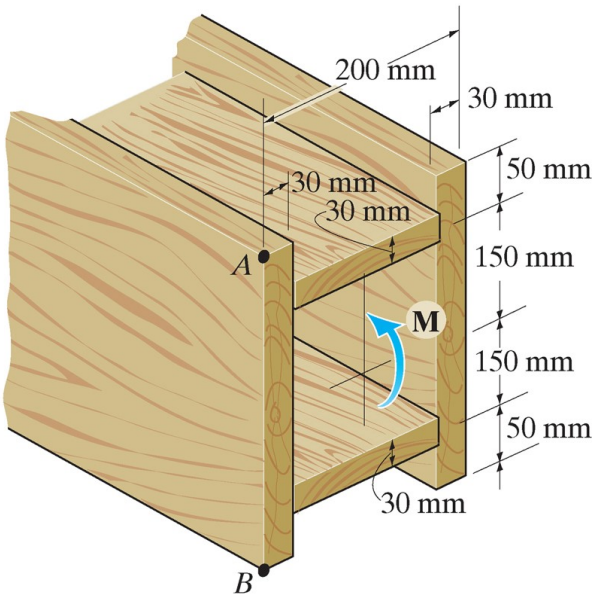
2. Draw the shear-moment diagram for the simply supported beam



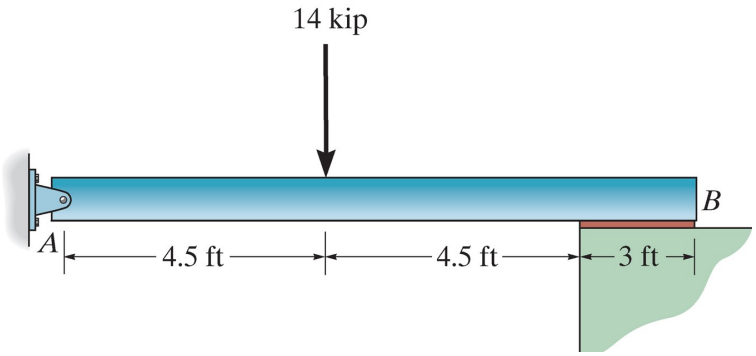
3. Members ABC and BD are rigidly connected at B while the smooth collar at D is allowed to move along the vertical post. Draw the shear-moment diagram for ABC.



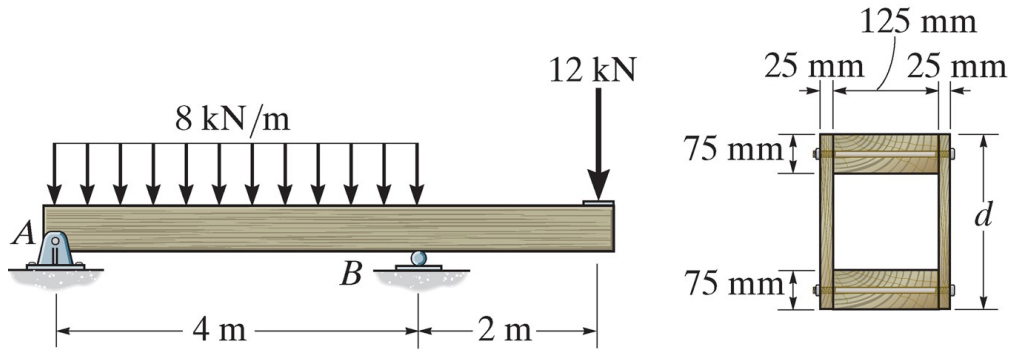
4. If the beam is subjected to a bending moment of $M = 10\,\text{kN} \cdot \text{m}$ find the bending stress in the beam at points A and B



5. Find the absolute maximum bending stress in the beam assuming that the support at B exerts a uniformly distributed reaction on the beam. The cross section is rectangular with a base of 3 in and a height of 5 in



6. If the allowable bending stress is $\sigma_{allow} = 6\,\text{MPa}$, find the maximum dimension, d of the beams cross sectional area.



7. These garden shears were manufactured using an inferior material. Using a load of 50 lb and appropriate dimensions find the maximum bending stress and show why failure occurred at this location