ME 323: Mechanics of Materials ***Homework Set H17***

Summer 2025 ***Assigned/Due: July 9/July 15***

Consider the loading on the beam shown below where the beam is fixed to a wall at B and a roller support at C. Using integration techniques, determine the reaction on the beam at C and the displacement of end D of the beam. In your work, explicitly show the following steps:

a) Draw FBD of beam and write down the equilibrium equations for the beam. Is this a determinate problem?

b) Make a mathematical cut in beam between B and C (at a location "x").

   i. Draw an FBD of the beam between B and the cut at "x".

   ii. Determine the bending moment, M(x), in the beam at "x".

   iii. Integrate M(x) to find $\theta(x)$.

   iv. Integrate $\theta(x)$ to find v(x).

   v. Evaluate the reaction on the beam at C.

c) Make a mathematical cut in the beam between C and D. Repeat Steps i.-iv. above to find $\theta(x)$ and v(x) for "x" between C and D.

d) Evaluate v(2a).