

Lecture 20 - Superposition

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schedule

- 29 Oct - Beam Deflection (superposition)
- 3 Nov - Statically Indeterminate Beams, HW 9 Due, HW 8 Self-Grade Due
- 5 Nov - Statically Indeterminate Beams
- 10 Nov - Statically Indeterminate Beams, HW 10 Due, HW 9 Self-Grade Due

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- superposition

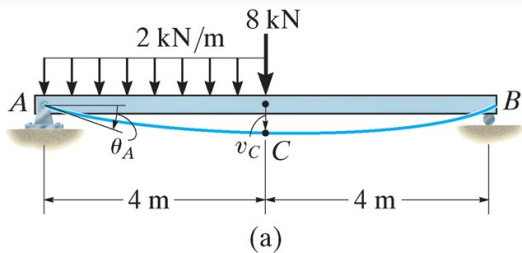
superposition

- The differential equation $EI d^4 v / dx^4 = w(x)$ satisfies the requirements for superposition
- $w(x)$ is linearly related to $v(x)$
- Load does not significantly change the shape of the beam

- This means we can superpose multiple deflection solutions from simpler cases
- Appendix C in the text has many solutions that can be superposed

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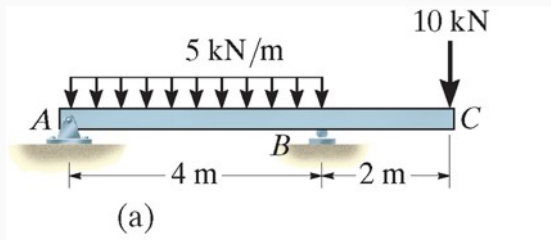
example 12.13



Use superposition to find the displacement at C and the slope at A

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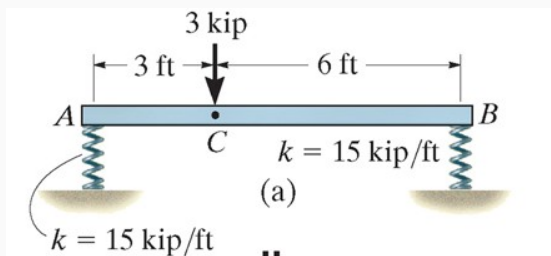
example 12.15



Use superposition to find the displacement at C

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example 12.16



The steel bar is supported by springs with $k=15 \text{ kip/ft}$ originally unstretched. For the force shown, determine the displacement at C. Take $E_{st} = 29 \text{ Msi}$ and $I = 12 \text{ in}^4$.

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