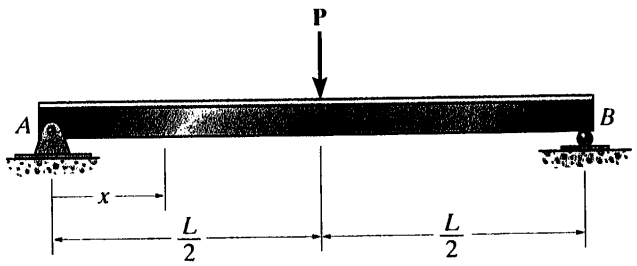
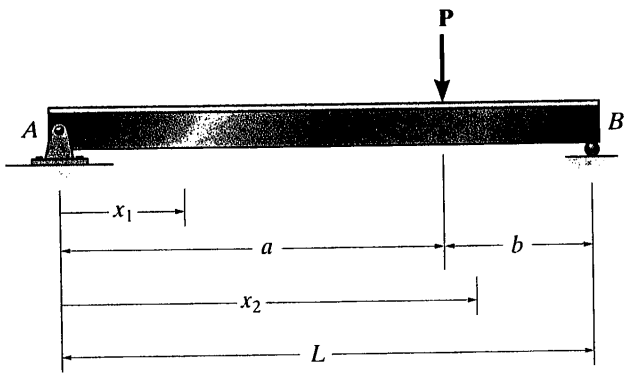
PROBLEMS

8–1. Determine the equation of the elastic curve for the beam using the x coordinate that is valid for $0 \leq x < L/2$. Specify the slope at A and the beam's maximum deflection. EI is constant.



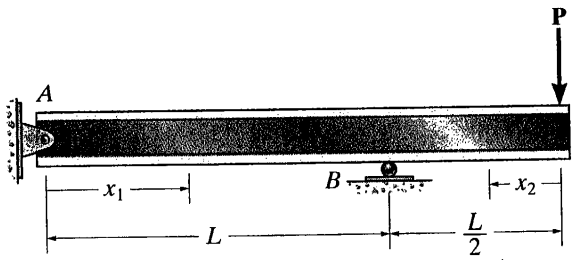
Prob. 8–1

8–2. Determine the equations of the elastic curve using the x_1 and x_2 coordinates. EI is constant.



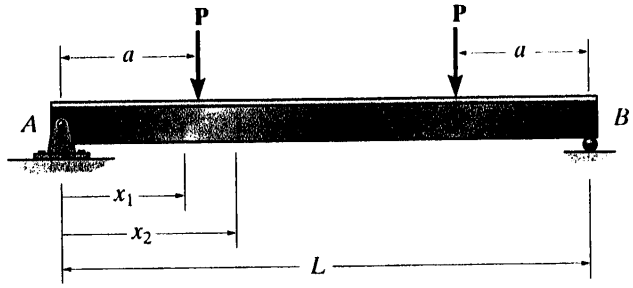
Prob. 8–2

8–3. Determine the equations of the elastic curve for the beam using the x_1 and x_2 coordinates. Specify the beam's maximum deflection. EI is constant.



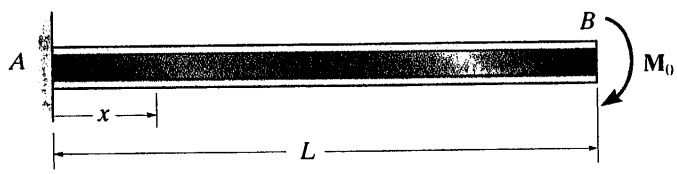
Prob. 8–3

***8–4.** Determine the equations of the elastic curve for the beam using the x_1 and x_2 coordinates. Specify the slope at A and the maximum deflection. EI is constant.



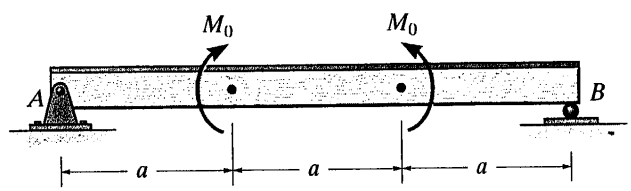
Prob. 8–4

8–5. Determine the elastic curve for the cantilevered beam, which is subjected to the couple moment $\mathbf{M}_0$. Also compute the maximum slope and maximum deflection of the beam. EI is constant.



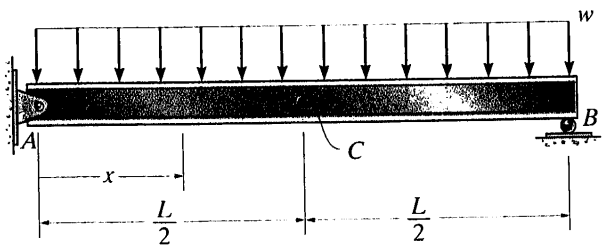
Prob. 8–5

8–6. Determine the maximum deflection of the beam and the slope at A. Use the method of double integration. EI is constant.



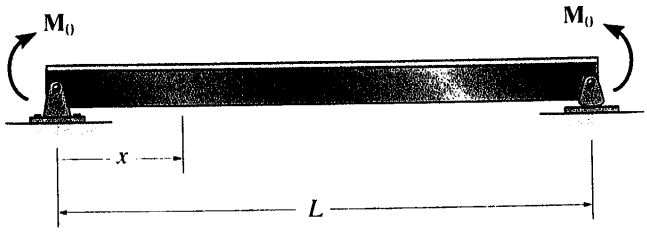
Prob. 8–6

8–7. Determine the equation of the elastic curve using the coordinate x, and specify the slope at point A and the deflection at point C. EI is constant.



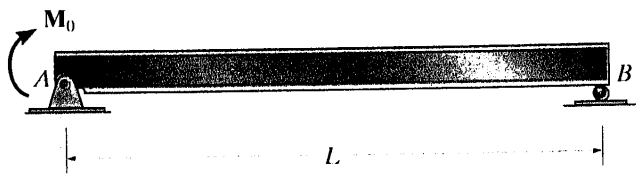
Prob. 8–7

***8–8.** Determine the elastic curve for the simply supported beam, which is subjected to the couple moments $\mathbf{M}_0$. Also, compute the maximum slope and the maximum deflection of the beam. EI is constant.



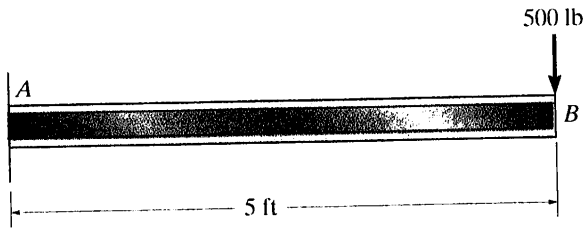
Prob. 8–8

8–9. Determine the maximum slope and maximum deflection of the simply supported beam that is subjected to the couple moment $\mathbf{M}_0$. Use the method of double integration. EI is constant.



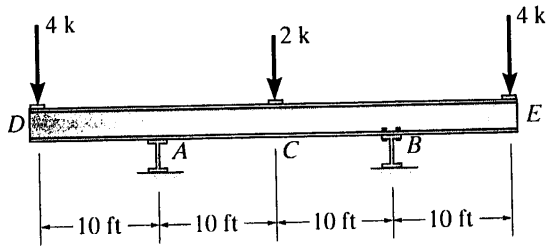
Prob. 8–9

8–10. Use the moment-area theorems and determine the slope and deflection at B. EI is constant.



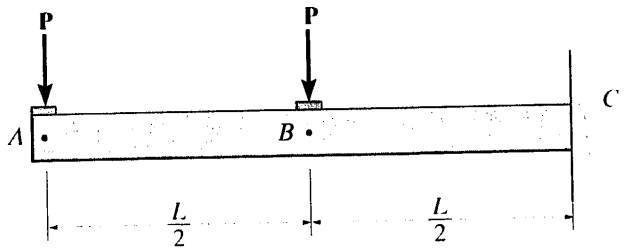
Prob. 8–10

8–11. Determine the slope at B and the maximum deflection of the beam. Assume A is a roller and B is a pin. Take $E = 29(10^3)$ ksi, $I = 500\ \text{in}^4$. Use the moment-area theorems.



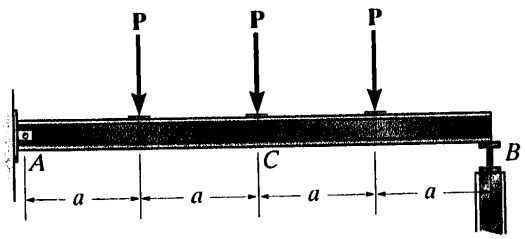
Prob. 8–11

***8–12.** The beam is subjected to the two loads. Use the moment-area theorems and determine the slope and displacement at points A and B. EI is constant.



Prob. 8–12

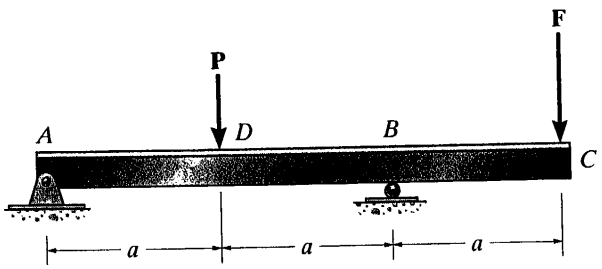
8–13. The beam is subjected to the loading shown. Use the moment-area theorems and determine the slope at A and the displacement at C. Assume the support at A is a pin and B is a roller. EI is constant.



Prob. 8–13

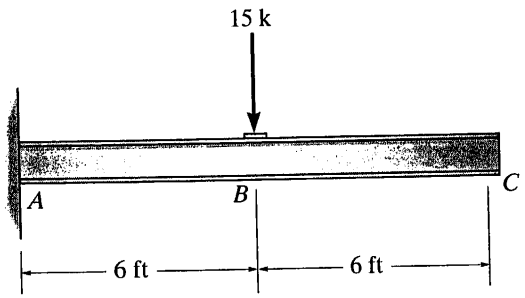
8–14. The beam is subjected to the load **P** as shown. Use the moment-area theorems and determine the magnitude of force **F** that must be applied at the end of the overhang C so that the displacement at C is zero. EI is constant.

8–15. The beam is subjected to the load **P** as shown. If **F** = **P**, determine the displacement at D. Use the moment-area theorems. EI is constant.



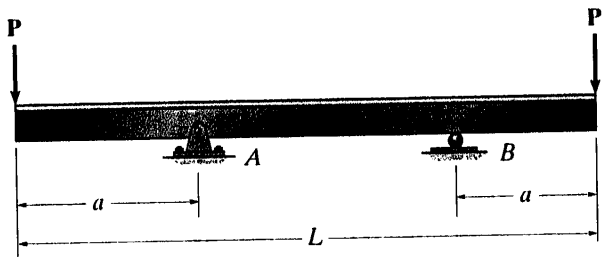
Probs. 8–14/8–15

***8–16.** Determine the slope at B and the maximum deflection of the beam. Take $E = 29(10^3)$ ksi, $I = 500\ \text{in}^4$. Use the moment-area theorems.



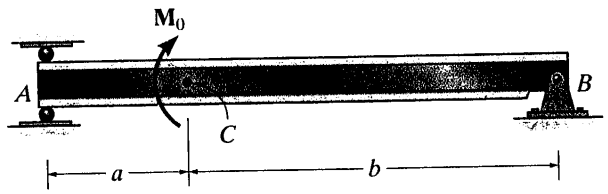
Prob. 8–16

8–17. At what distance a should the bearing supports at A and B be placed so that the deflection at the center of the shaft is equal to the deflection at its ends? Use the moment-area theorems. The bearings exert only vertical reactions on the shaft. EI is constant.



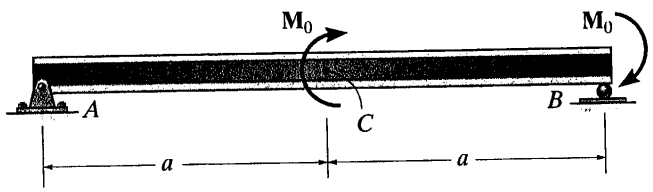
Prob. 8–17

8–18. The beam is subjected to the loading shown. Use the moment-area theorems and determine the slope at B and deflection at C. EI is constant.



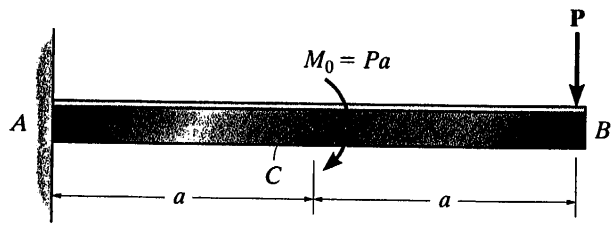
Prob. 8–18

8–19. The shaft is subjected to the loading shown. If the bearings at A and B only exert vertical reactions on the shaft, determine the slope at A and the displacement at C. Use the moment-area theorems. EI is constant.



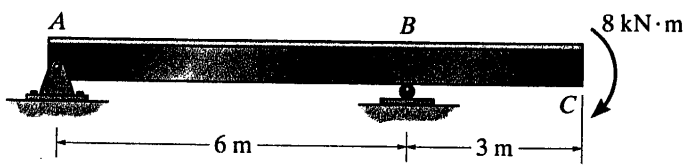
Prob. 8–19

*8–20. Use the moment-area theorems and determine the slope at B and the deflection at C. EI is constant.



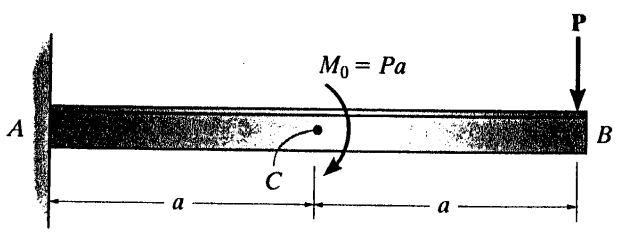
Prob. 8–20

8–21. Use the moment-area theorems and determine the deflection at C and the slope of the beam at A, B, and C. EI is constant.



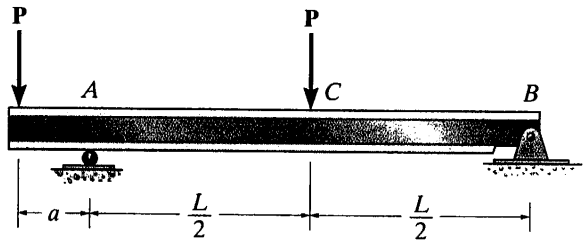
Prob. 8–21

8–22. Use the moment-area theorems and determine the slope at C and the deflection at B. EI is constant.



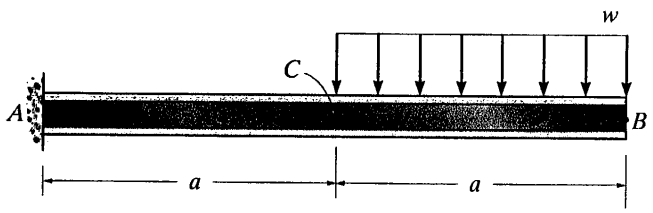
Prob. 8–22

8–23. Use the moment-area theorems and determine the value of a so that the slope at A is equal to zero. EI is constant.



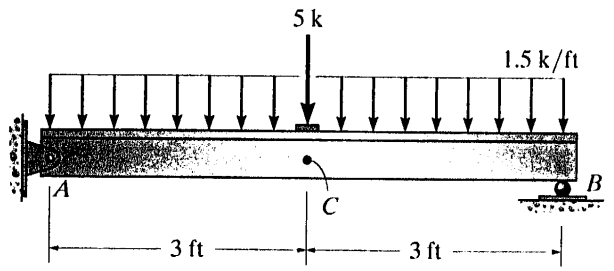
Prob. 8–23

*8–24. Use the moment-area theorems and determine the slope at C and displacement at B. EI is constant.



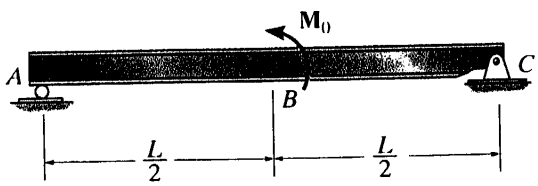
Prob. 8–24

8–25. Use the moment-area theorems and determine the slope at B and the displacement at C. The member is an A-36 steel structural Tee for which $I = 76.8\ \text{in}^4$.



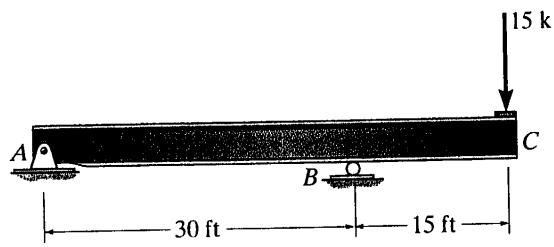
Prob. 8–25

8–26. Use the moment-area theorems and determine the displacement at B and the slope at A. EI is constant.



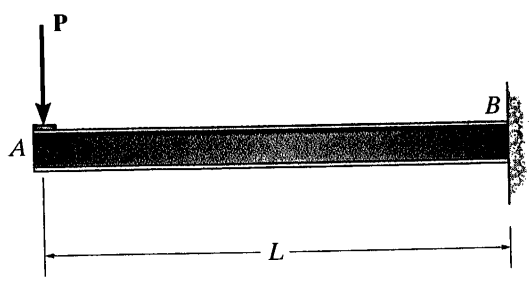
Prob. 8–26

8–27. Use the moment-area theorems and determine the displacement at C. Take $E = 29(10^3)$ ksi, $I = 1200\ \text{in}^4$.



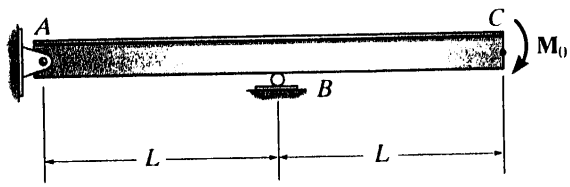
Prob. 8–27

***8–28.** Use the conjugate-beam method and determine the slope and displacement at A. EI is constant.



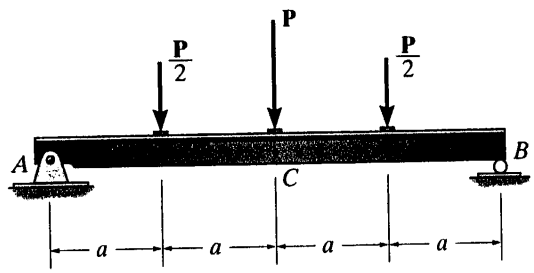
Prob. 8–28

8–29. Use the conjugate-beam method and determine the displacement at C and the slope at A, B, and C. EI is constant.



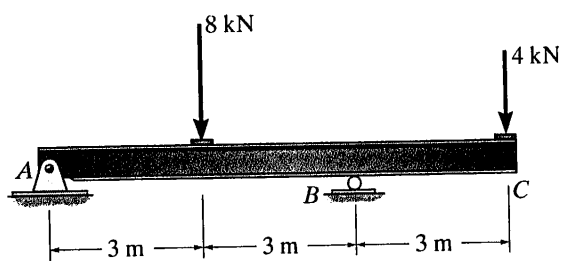
Prob. 8–29

8–30. Use the conjugate-beam method and determine the slope at B and displacement at C. EI is constant.



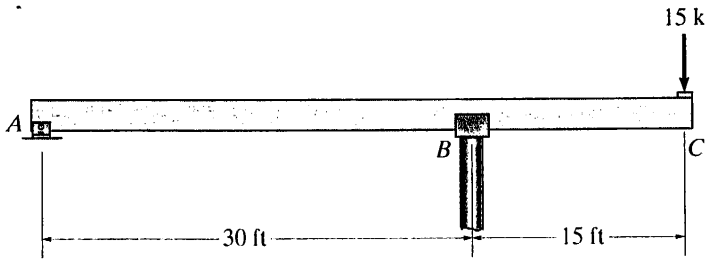
Prob. 8–30

8–31. Use the conjugate-beam method and determine the slope and the displacement at the end C of the beam. $E = 200$ GPa, $I = 70(10^6)\ \text{mm}^4$.



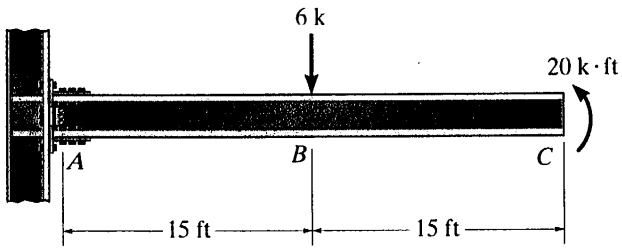
Prob. 8–31

*8–32. Use the conjugate-beam method and determine the slope and deflection at C. Assume A is a pin and B is a roller. EI is constant.



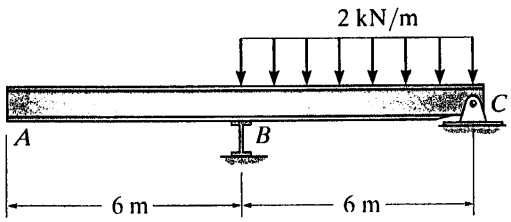
Prob. 8–32

8–33. Use the conjugate-beam method and determine the slope and deflection at C. $E = 29(10^3)$ ksi, $I = 800$ in^4.



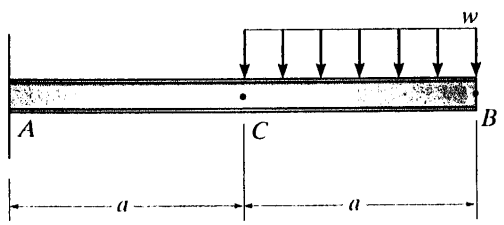
Prob. 8–33

8–34. Use the conjugate-beam method and determine the displacement at A. Assume B is a roller. $E = 200$ GPa, $I = 80(10^6)$ mm^4.



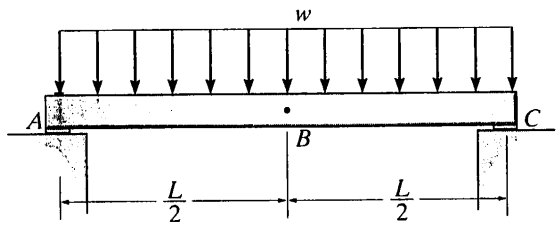
Prob. 8–34

8–35. Use the conjugate-beam method and determine the slope at C and the displacement at B. EI is constant.



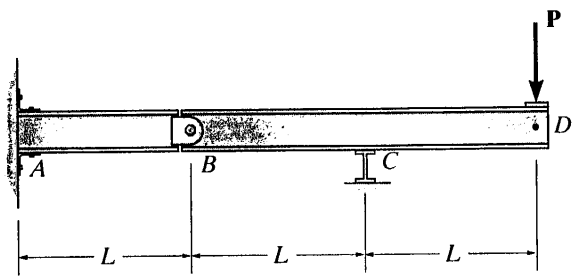
Prob. 8–35

*8–36. Use the conjugate-beam method and determine the displacement at B and the slope at A. Assume the support at A is a pin and C is a roller. EI is constant.



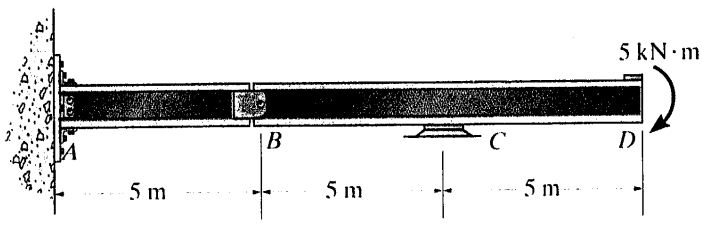
Prob. 8–36

8–37. Use the conjugate-beam method and determine the displacement at D and the slope at C. Assume A is a fixed support and C is a roller. EI is constant.



Prob. 8–37

8–38. Use the conjugate-beam method and determine the slope just to the left and just to the right of the pin at B. Also, determine the deflection at D. Assume the beam is fixed supported at A, and that C is a roller. EI is constant.



Prob. 8–38