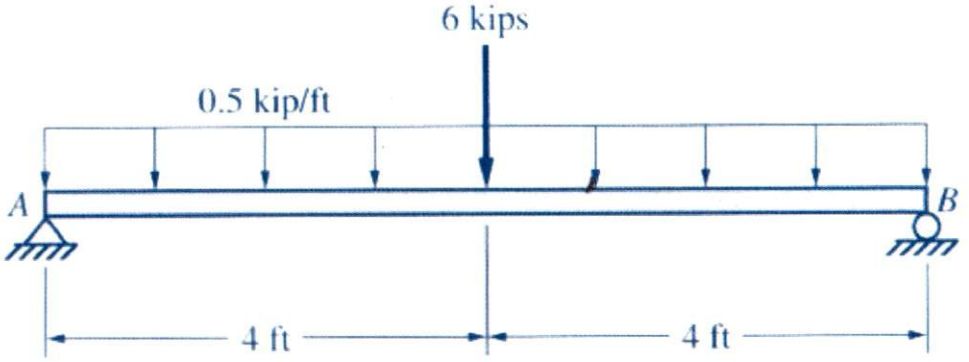
**13–38** to **13–45** Refer to Figs. P13–38 to P13–45. Find the maximum shear force and the maximum bending moment in the beam in each figure due to the loading shown by using the formulas in Table 13–1.

13-41




Solution.

From Table 13-1 and use the Method of Superposition

From case 1 – simple beam with a concentrated load at the center

and case 2 - simple beam with a uniform load

$$V_{MAX} = \frac{P}{2} + \frac{wL}{2}$$

$$= \frac{6\ \text{kips}}{2} + \frac{0.5\ \text{kip/ft}\,(8\ \text{ft})}{2}$$

$$= 3\ \text{kips} + 2\ \text{kips}$$

$$= \underline{5\ \text{kips}}$$

$$M_{MAX} = \frac{PL}{4} + \frac{wL^2}{8}$$

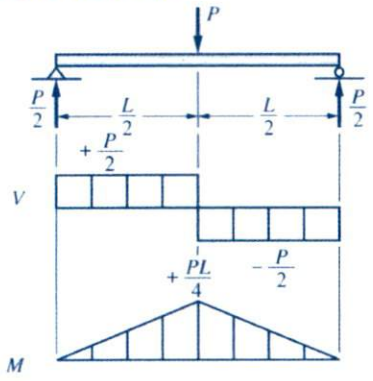
$$= \frac{6\ \text{kips}\,(8\ \text{ft})}{4} + \frac{0.5\ \frac{\text{kip}}{\text{ft}}\,(8\ \text{ft})^2}{8}$$

$$= 12\ \text{kip}\cdot\text{ft} + 4\ \text{kip}\cdot\text{ft}$$

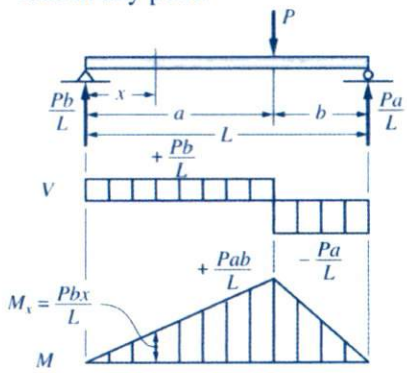
$$= \underline{16\ \text{kip}\cdot\text{ft}}$$

**TABLE 13–1 Shear and Moment Formulas for Some Simple Loadings**

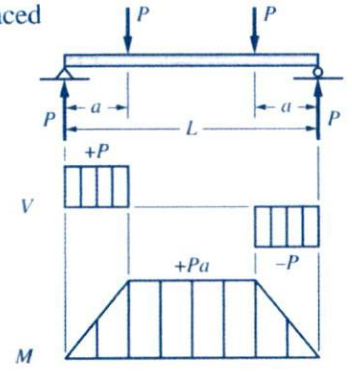
**1.** Simple beam with a concentrated load at the center



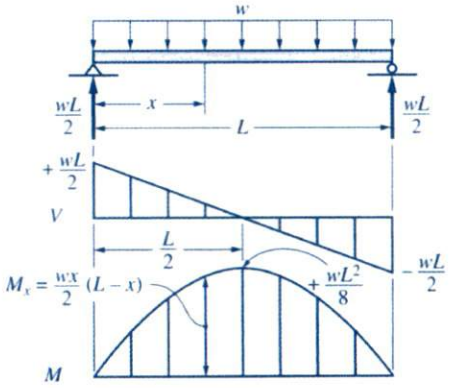

**2.** Simple beam with a concentrated load at any point



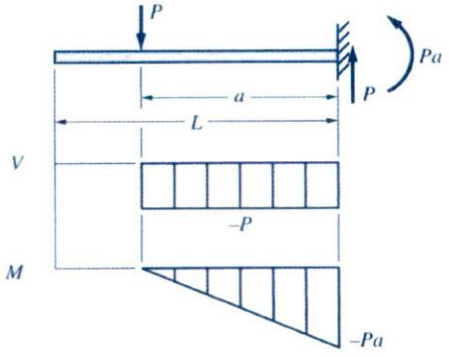

**3.** Simple beam with two equal concentrated loads symmetrically placed




**4.** Simple beam with a uniform load




**5.** Cantilever beam with a concentrated load at any point




**6.** Cantilever beam with a uniform load