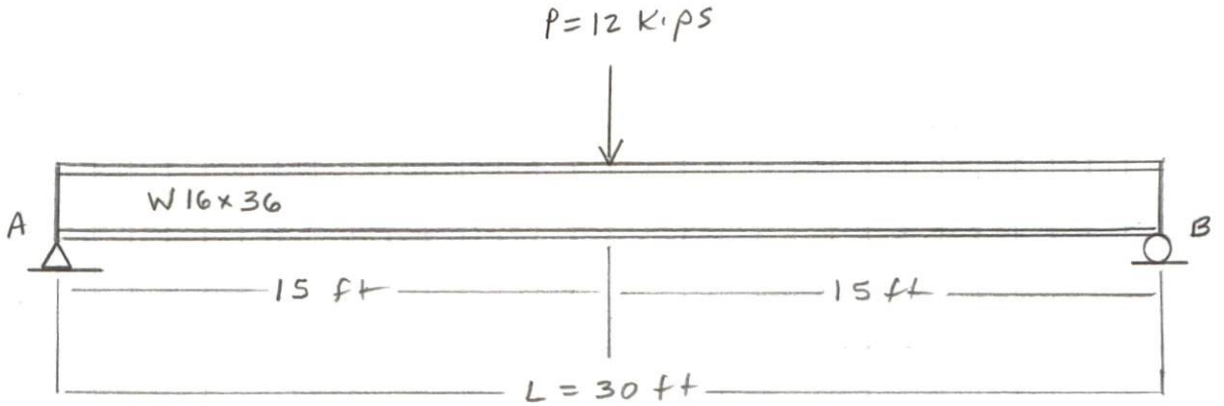
16-7

A W16 x 36 steel section is used in a 30-ft simple span. Compute the maximum deflection due to a concentrated load of 12 kips at the midspan.

Solution.



$P = 12$ kips

$L = 30\text{ ft} \times \frac{12\text{ in}}{\text{ft}} = 360$ in.

$E = 30\,000$ ksi (steel)

Table A-1(a) W16x36

$I = 448$ in.^{4}

Table 16-1, case 5

$$\delta_{MAX} = \frac{PL^3}{48EI} = \frac{12\text{ kips}\,(360\text{ in})^3}{48\,(30\,000\text{ ksi})\,(448\text{ in}^4)}$$

$$= \frac{559{,}872{,}000\text{ kip}\cdot\text{in}^3}{645{,}120{,}000\text{ kip}\cdot\text{in}^2}$$

$$= 0.868\text{ in.}$$