10.2

\[ M_k = 875 \text{ kN} \cdot \text{m} \]

\[ \sigma_{\text{FY}} = 6 \]
\[ A_Y = 5 \text{ (z=1.16)} \]
\[ A_Y = 41 \text{ kN} \]

\[ M_1 = A_Y x_1 - M_k - \frac{2 x_1^2}{2} \]
\[ M_1 = 41 x_1 - 474 - x_1^2 \]

\[ M_2 = -5 x_2 \]

Unit Load at B:
\[ \sum M_B = 0 \]
\[ -11(18) + M_A = 0 \]
\[ M_A = 181 \text{ kN} \cdot \text{m} \]
\[ A_Y = 1 \text{ kN} \]

\[ m(x_1) = A_Y x_1 - M_k \]
\[ = x_1 - 18 \]

\[ m(x_2) = 0 \]

For Robot

\[ \begin{align*}
  & h = 12 \\
  & b = 4.167 \\
  & h = 6 \\
  & b = 7.831
\end{align*} \]

Josh Caffrey
The percent difference is equal to 0 due to the fact that my hand calculations are the exact same as the software generated calculations.