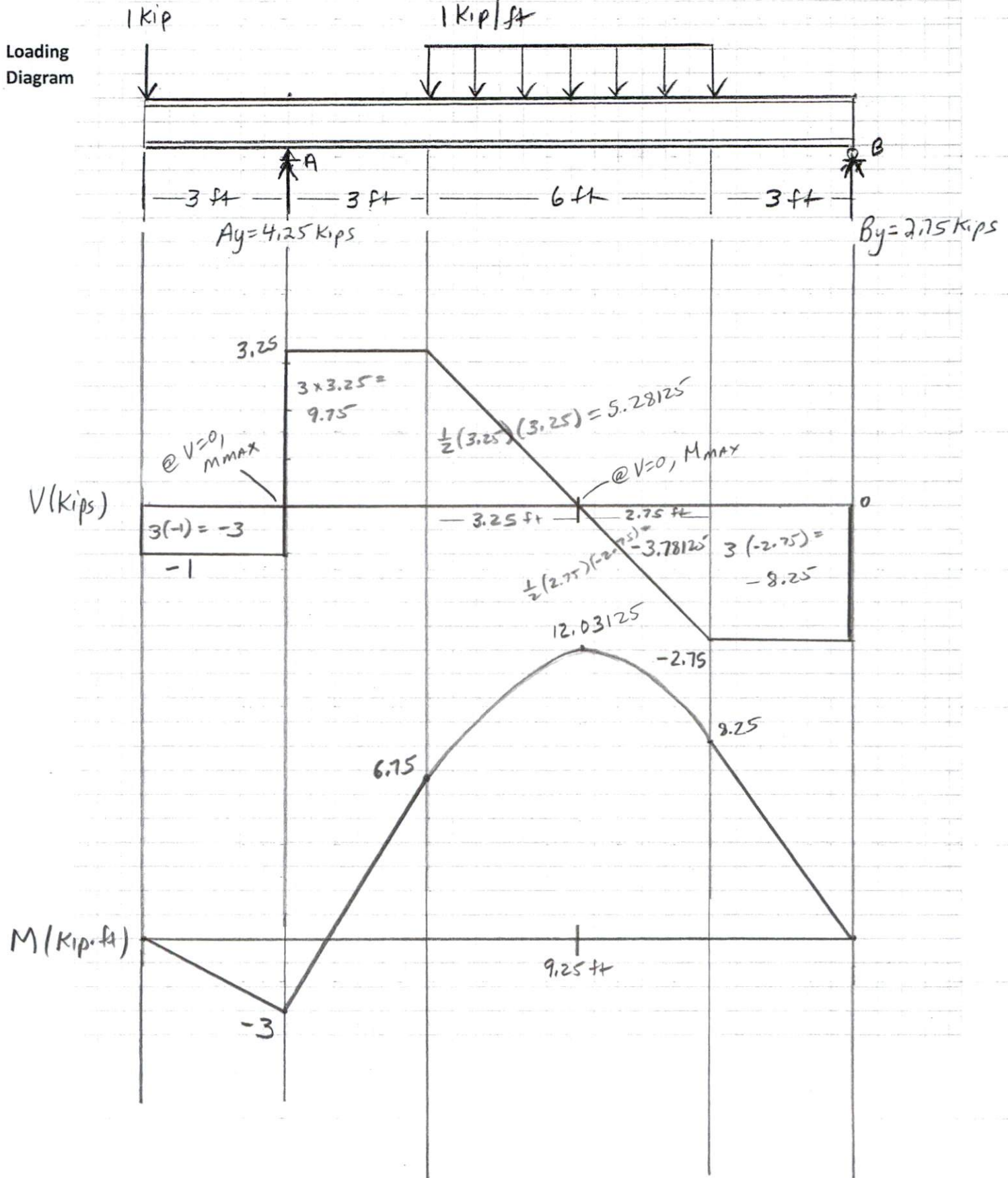


Show all work for full credit. You may work with ONE other person. One page of notes (Front & Back). Tables. Algebra and Trig Cheat Sheets.

Due: End of Class Today

Name: Solution

1. Draw the shear and bending moment diagrams for the beam due to the loading shown. Locate the section(s) with zero shear and determine the moment(s) at the section(s).



2. A 6-in x 10-in nominal size rectangular southern pine timber beam has a 20-ft simple span. The beam is subjected to a 800 lb/ft uniform load applied to the entire span and a 200 lb concentrated load at midspan. The allowable deflection is $1/240$ of the span length. Determine whether the beam is satisfactory for deflection.

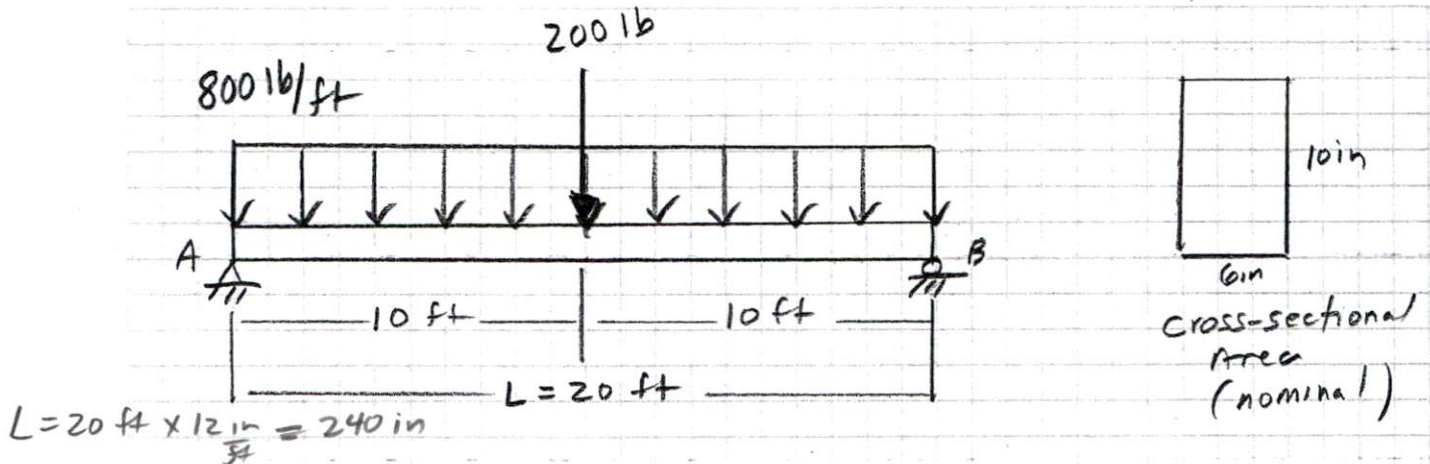


Table 16-1, case 5 and case 7

Table A-6(a)

$$I = 393 \text{ in}^4$$

$$\delta_{\max} = \frac{PL^3}{48EI} + \frac{5WL^4}{384EI}$$

Table A-7(a)

$$E = 1800 \text{ ksi}$$

$$= \frac{0.2 \text{ Kip} (240 \text{ in})^3}{48 (1800 \text{ ksi}) (393 \text{ in}^4)} + \frac{5 (0.8 \text{ K/ft}) \left(\frac{\text{ft}}{12 \text{ in}}\right) (240 \text{ in})^4}{384 (1800 \text{ ksi}) (393 \text{ in}^4)}$$

$$= \frac{2,764,800 \text{ in}}{33,955,200} + \frac{1,105,920,000 \text{ in}}{271,641,600}$$

$$= 0.0814 \text{ in} + 4.0712 \text{ in}$$

$$= 4.153 \text{ in}$$

$$\delta_{\text{allow}} = \frac{L}{240} = \frac{240 \text{ in}}{240} = 1 \text{ in}$$

$$\delta_{\max} = 4.153 \text{ in} > \delta_{\text{allow}} = 1 \text{ in}$$

Beam is not satisfactory for deflection