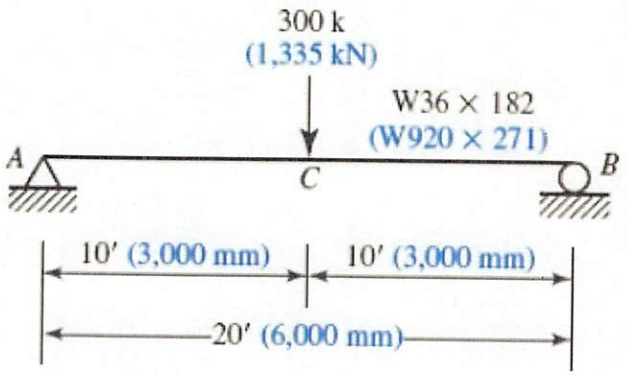
5.5-9 The beam shown in Figure P5.5-9 is a W36 × 182(**W920 × 271**) . It is laterally supported at A and B . The 300 kip **(1,335 kN)** load is a service live load. Using the unfactored service loads,

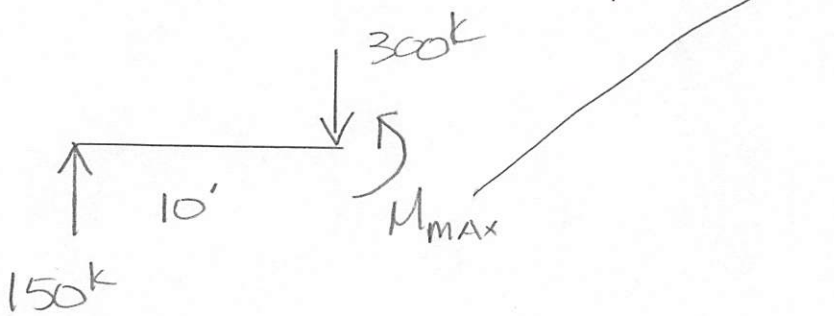
a. Compute C_b . Do not include the beam weight in the loading.

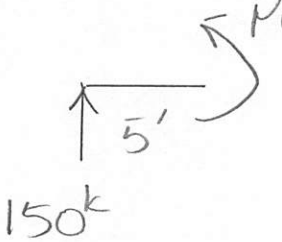
b. Compute C_b . Include the beam weight in the loading.



$$M_{MAX} = \frac{PL}{4} = \frac{300k(20ft)}{4}$$

$$= 1{,}500\ k\text{-}ft$$



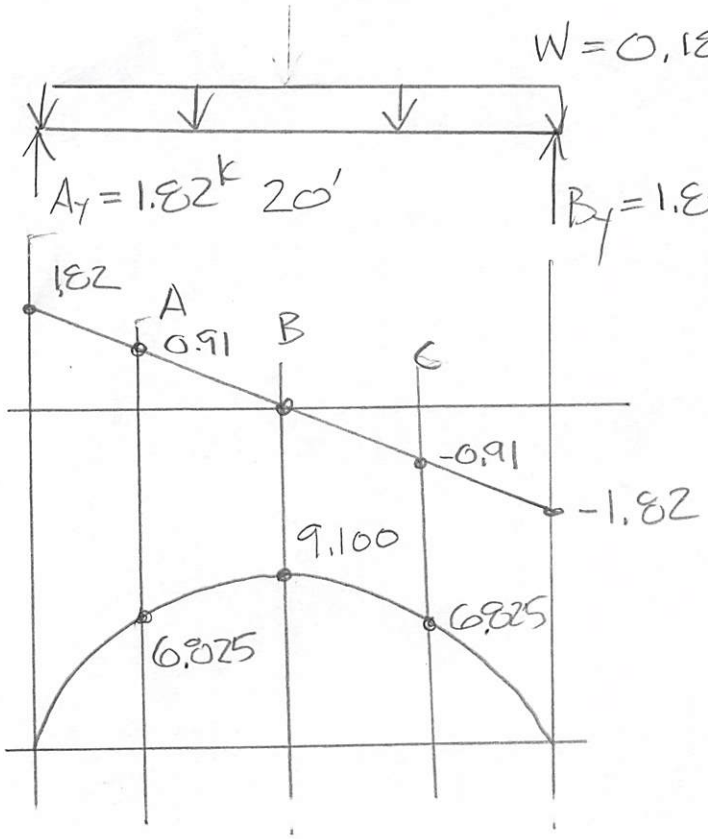


$$M_B = M_{MAX}$$

$$C_b = \frac{12.5M_{max}}{2.5M_{max} + 3M_A + 4M_B + 3M_C}$$

$$= \frac{12.5(1{,}500)}{2.5(1{,}500) + 3(750) + 4(1{,}500) + 3(750)} = \underline{\underline{1.316}}$$

5.5-9



$M_{MAX} = 1,500 + 9.10 = 1,509.1 \text{ k ft}$

$M_A = 750 + 6.83 = 756.83 \text{ k ft}$

$M_B = 1,500 + 9.10 = 1,509.1 \text{ k ft}$

$M_C = 750 + 6.83 = 756.83 \text{ k ft}$

$$C_b = \frac{12.5(1509)}{2.5(1509) + 3(756.8) + 4(1509) + 3(756.8)} = \underline{1.315}$$