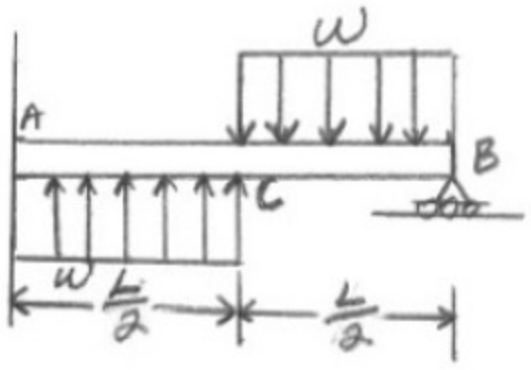
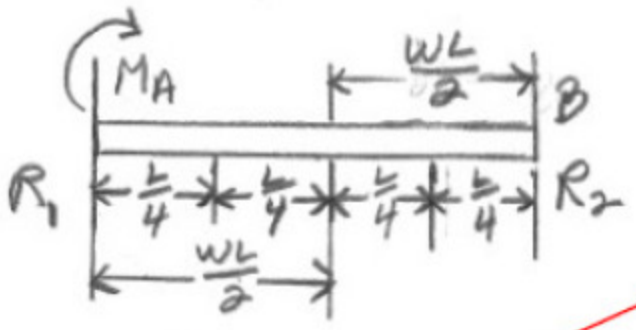
9.30:

(a)





$$R_1 + \frac{WL}{2} - \frac{WL}{2} + R_2 = 0$$

$$R_1 + R_2 = 0$$

$$R_1 = -R_2$$

$$-M_A - \left(\frac{WL}{2}\right)\frac{L}{2} + R_2 L = 0$$

$$-M_A - \frac{WL^2}{4} + R_2 L = 0$$

$$M_A = -\frac{WL^2}{4} + R_2 L$$

AC:

$$EI\frac{d^2y}{dx^2} = M_A + R_1 x + \frac{wx^2}{2}$$

$$EI\frac{dy}{dx} = M_A x + \frac{R_1 x^2}{2} + \frac{wx^3}{6} + C_1$$

$$EIy = \frac{M_A x^2}{2} + \frac{R_1 x^3}{6} + \frac{wx^4}{24} + C_1 x + C_2$$

Where did these expressions come from? How do I get these? I believe I need a diagram for both.

CB:

$$EI\frac{d^2y}{dx^2} = M_A + R_1 x + \frac{wL\left(x-\frac{L}{4}\right)}{2} - \frac{w\left(x-\frac{L}{2}\right)^2}{2}$$

$$EI\frac{dy}{dx} = M_A x + \frac{R_1 x^2}{2} + \frac{wL\left(x-\frac{L}{4}\right)^2}{4} - \frac{w\left(x-\frac{L}{2}\right)^3}{6} + C_3$$

$$EIy = \frac{M_A x^2}{2} + \frac{R_1 x^3}{6} + \frac{wL\left(x-\frac{L}{4}\right)^3}{12} - \frac{\left(x-\frac{L}{2}\right)^4}{24} + C_3 x + C_4$$

$C_1 = 0$ $\left(x=0, \frac{dy}{dx}=0\right)$ $C_2 = 0$ $(x=0, y=0)$

$\left(x=\frac{L}{2}, \frac{dx}{dy}\right)$

$$M_A\frac{L}{2} + \frac{R_1\left(\frac{L}{2}\right)^2}{2} + \frac{w\left(\frac{L}{2}\right)^3}{6} = M_A\left(\frac{L}{2}\right) + \frac{R_1\left(\frac{L}{2}\right)^2}{2} + \frac{wL\left(\frac{L}{2}-\frac{L}{4}\right)^2}{4} - \frac{w\left(\frac{L}{2}-\frac{L}{2}\right)^3}{6} + C_3$$