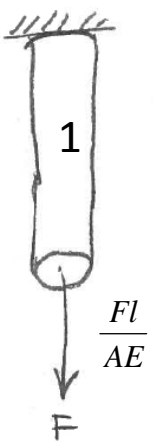
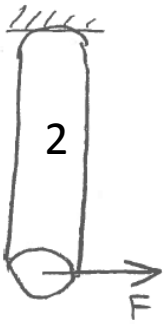
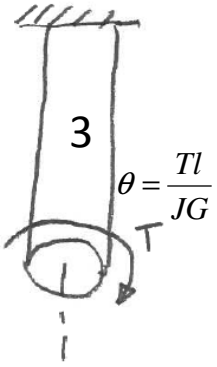
Structural Deflection



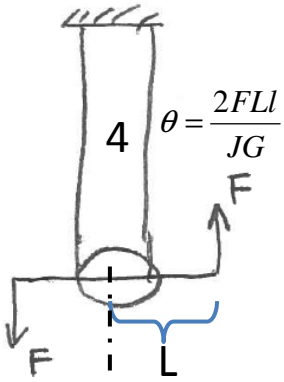
$$\frac{Fl}{AE}$$



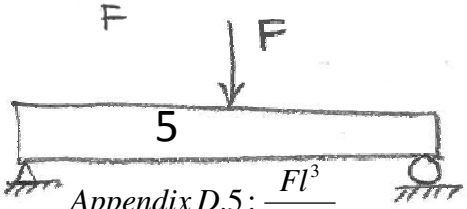
$$Appendix\ D.1: \frac{Fl^3}{3EI}$$



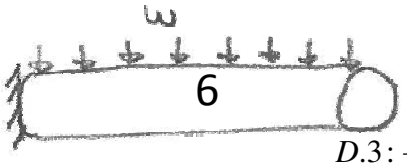
$$\theta = \frac{Tl}{JG}$$



$$\theta = \frac{2FLl}{JG}$$

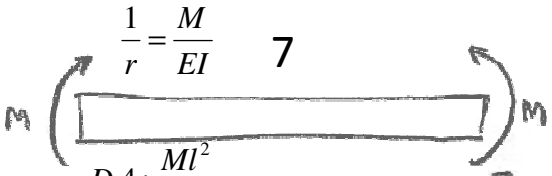


$$Appendix\ D.5: \frac{Fl^3}{48EI}$$

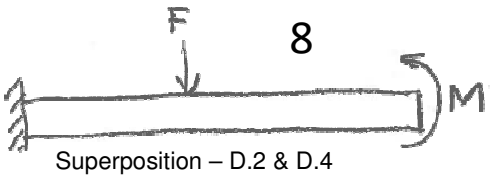


$$D.3: \frac{wl^4}{8EI}$$

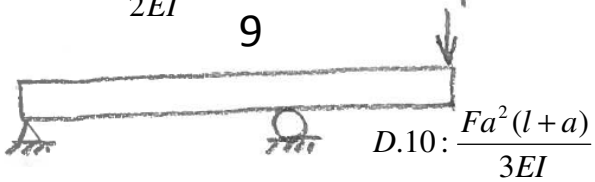
$$\frac{1}{r} = \frac{M}{EI}$$



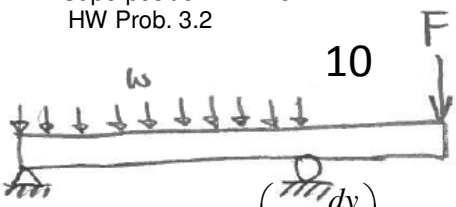
$$D.4: \frac{Ml^2}{2EI}$$



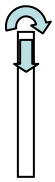
Superposition – D.2 & D.4
HW Prob. 3.2

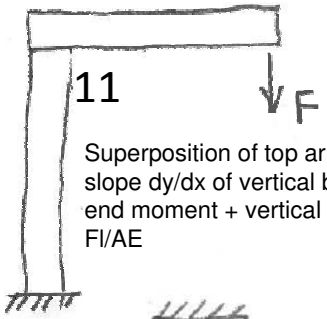


$$D.10: \frac{Fa^2(l+a)}{3EI}$$

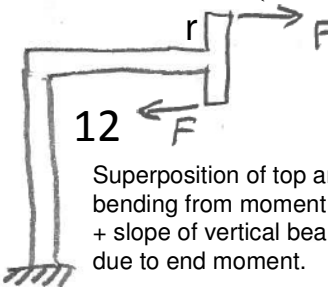


$$Get\ Slope\ from\ D.7\left(\theta = \frac{dy}{dx}\right) \Rightarrow y = r\theta; + D.10$$

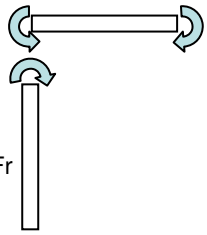


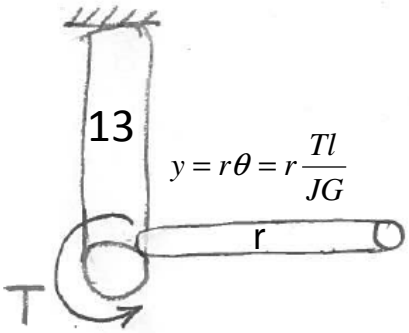


Superposition of top arm bending + slope dy/dx of vertical beam due to end moment + vertical compression Fl/AE

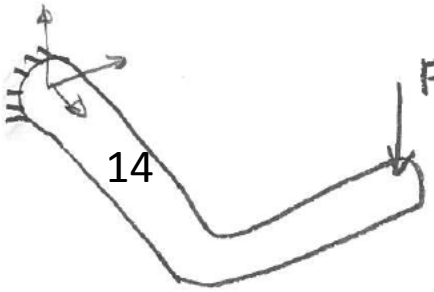


Superposition of top arm bending from moment 2Fr + slope of vertical beam due to end moment.





$$y = r\theta = r\frac{Tl}{JG}$$



Superposition – Lecture Example: 2 bendings + 1 rotation