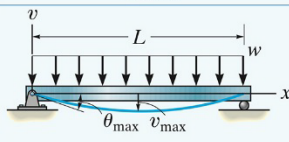
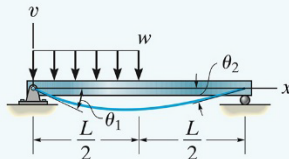
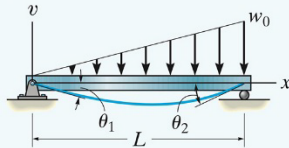
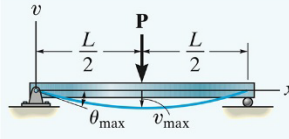
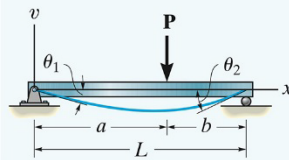
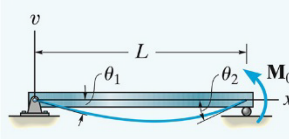


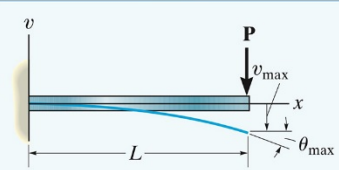
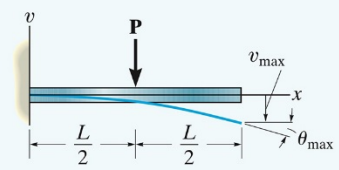
Simply Supported Beam Slopes and Deflections

Beam	Slope	Deflection	Elastic Curve
	$\theta_{\max} = \frac{-wL^3}{24EI}$	$v_{\max} = \frac{-5wL^4}{384EI}$	$v = \frac{-wx}{24EI} (x^3 - 2Lx^2 + L^3)$
	$\theta_1 = \frac{-3wL^3}{128EI}$ $\theta_2 = \frac{7wL^3}{384EI}$	$v \Big _{x=L/2} = \frac{-5wL^4}{768EI}$ $v_{\max} = -0.006563 \frac{wL^4}{EI}$ at $x = 0.4598L$	$v = \frac{-wx}{384EI} (16x^3 - 24Lx^2 + 9L^3)$ $0 \leq x \leq L/2$ $v = \frac{-wL}{384EI} (8x^3 - 24Lx^2 + 17L^2x - L^3)$ $L/2 \leq x < L$
	$\theta_1 = \frac{-7w_0L^3}{360EI}$ $\theta_2 = \frac{w_0L^3}{45EI}$	$v_{\max} = -0.00652 \frac{w_0L^4}{EI}$ at $x = 0.5193L$	$v = \frac{-w_0x}{360EI} (3x^4 - 10L^2x^2 + 7L^4)$

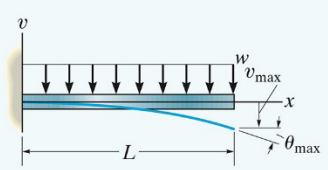
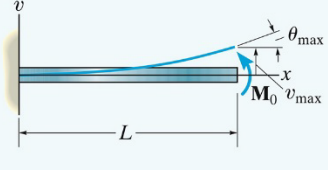
Simply Supported Beam Slopes and Deflections

Beam	Slope	Deflection	Elastic Curve
	$\theta_{\max} = \frac{-PL^2}{16EI}$	$v_{\max} = \frac{-PL^3}{48EI}$	$v = \frac{-Px}{48EI} (3L^2 - 4x^2)$ $0 \leq x \leq L/2$
	$\theta_1 = \frac{-Pab(L+b)}{6EIL}$ $\theta_2 = \frac{Pab(L+a)}{6EIL}$	$v \Big _{x=a} = \frac{-Pba}{6EIL} (L^2 - b^2 - a^2)$	$v = \frac{-Pbx}{6EIL} (L^2 - b^2 - x^2)$ $0 \leq x \leq a$
	$\theta_1 = \frac{-M_0L}{6EI}$ $\theta_2 = \frac{M_0L}{3EI}$	$v_{\max} = \frac{-M_0L^2}{9\sqrt{3}EI}$ at $x = 0.5774L$	$v = \frac{-M_0x}{6EIL} (L^2 - x^2)$

Cantilevered Beam Slopes and Deflections

Beam	Slope	Deflection	Elastic Curve
	$\theta_{\max} = \frac{-PL^2}{2EI}$	$v_{\max} = \frac{-PL^3}{3EI}$	$v = \frac{-Px^2}{6EI} (3L - x)$
	$\theta_{\max} = \frac{-PL^2}{8EI}$	$v_{\max} = \frac{-5PL^3}{48EI}$	$v = \frac{-Px^2}{12EI} (3L - 2x) \quad 0 \leq x \leq L/2$ $v = \frac{-PL^2}{48EI} (6x - L) \quad L/2 \leq x \leq L$

Cantilevered Beam Slopes and Deflections

Beam	Slope	Deflection	Elastic Curve
	$\theta_{\max} = \frac{-wL^3}{6EI}$	$v_{\max} = \frac{-wL^4}{8EI}$	$v = \frac{-wx^2}{24EI} (x^2 - 4Lx + 6L^2)$
	$\theta_{\max} = \frac{M_0L}{EI}$	$v_{\max} = \frac{M_0L^2}{2EI}$	$v = \frac{M_0x^2}{2EI}$

Cantilevered Beam Slopes and Deflections

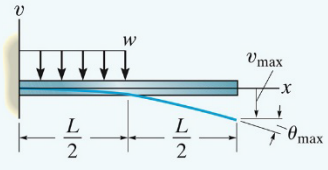
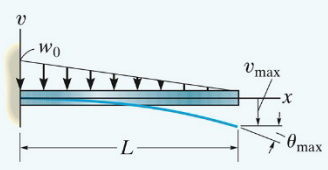
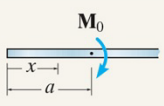
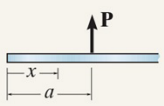
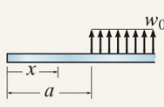
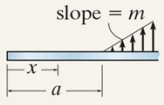
Beam	Slope	Deflection	Elastic Curve
	$\theta_{\max} = \frac{-wL^3}{48EI}$	$v_{\max} = \frac{-7wL^4}{384EI}$	$v = \frac{-wx^2}{24EI} \left(x^2 - 2Lx + \frac{3}{2}L^2 \right) \quad 0 \leq x \leq L/2$ $v = \frac{-wL^3}{384EI} (8x - L) \quad L/2 \leq x \leq L$
	$\theta_{\max} = \frac{-w_0L^3}{24EI}$	$v_{\max} = \frac{-w_0L^4}{30EI}$	$v = \frac{-w_0x^2}{120EI} (10L^3 - 10L^2x + 5Lx^2 - x^3)$

TABLE 12-2

Loading	Loading Function $w = w(x)$	Shear $V = \int w(x)dx$	Moment $M = \int Vdx$
	$w = M_0 \langle x-a \rangle^{-2}$	$V = M_0 \langle x-a \rangle^{-1}$	$M = M_0 \langle x-a \rangle^0$
	$w = P \langle x-a \rangle^{-1}$	$V = P \langle x-a \rangle^0$	$M = P \langle x-a \rangle^1$
	$w = w_0 \langle x-a \rangle^0$	$V = w_0 \langle x-a \rangle^1$	$M = \frac{w_0}{2} \langle x-a \rangle^2$
	$w = m \langle x-a \rangle^1$	$V = \frac{m}{2} \langle x-a \rangle^2$	$M = \frac{m}{6} \langle x-a \rangle^3$