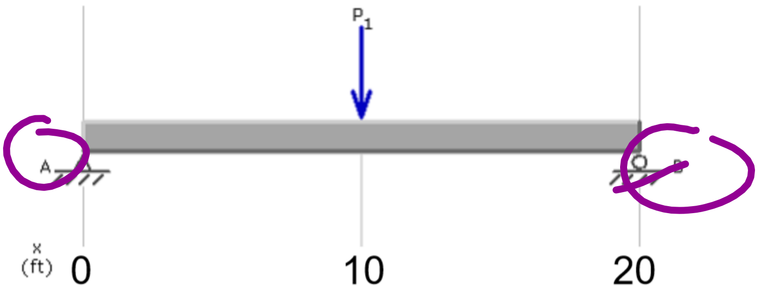
All beams are simply supported and are 20 **feet long**. All uniform loads are **w = 160 lb/ft.**
All concentrated loads are **P = 400 lb.** Find reaction forces and moment.



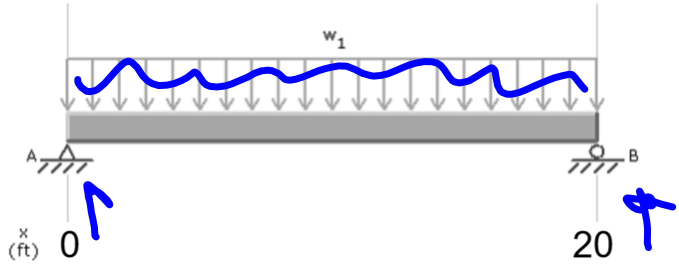
Reaction	$R_A = R_B = \frac{P}{2}$		(12.1)
Moment	$M_{max} = \frac{PL}{4}$	(at point of load)	(12.2)
~~**Deflection**~~	$\cancel{\Delta_{max} = \frac{PL^3}{48EI}}$	~~(at point of load)~~	~~(12.3)~~

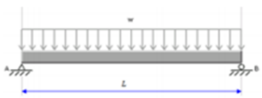
$$RA = RB = \frac{400}{2}$$

200 lb

$$M = \frac{(400)(20)}{4} = 2000 \text{ lbs}$$

All beams are simply supported and are 20 **feet long**. All uniform loads are **w = 160 lb/ft.** All concentrated loads are **P = 400 lb.** Find reaction forces and moment.



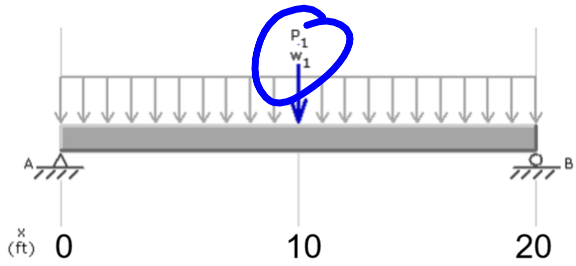


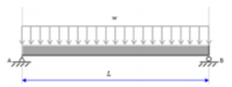
Reaction	$R_A = R_B = \frac{\omega L}{2}$		(12.4)
Moment	$M_{max} = \frac{\omega L^2}{8}$	(at center)	(12.5)
~~**Deflection**~~	$\cancel{\Delta_{max} = \frac{5\omega L^4}{384EI}}$	(at center)	(12.6)

$$RA = RB = \frac{(160)(20)}{2} = 1600 \text{ lb}$$

$$M = \frac{160(20)^2}{8} = 8000 \text{ lb}$$

All beams are simply supported and are 20 **feet long**. All uniform loads are **w = 160 lb/ft.**
All concentrated loads are **P = 400 lb.** Find reaction forces and moment.



	**Reaction**	$R_A = R_B = \frac{P}{2}$		(12.1)
	Moment	$M_{max} = \frac{PL}{4}$	(at point of load)	(12.2)
	Deflection	$\Delta_{max} = \frac{PL^3}{48EI}$	(at point of load)	(12.3)
	**Reaction**	$R_A = R_B = \frac{\omega L}{2}$		(12.4)
	Moment	$M_{max} = \frac{\omega L^2}{8}$	(at center)	(12.5)
	Deflection	$\Delta_{max} = \frac{5\omega L^4}{384EI}$	(at center)	(12.6)

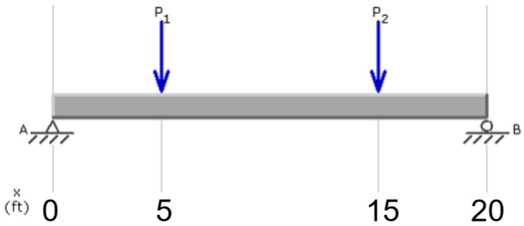
$$RA = RB = \frac{P}{2} + \frac{wL}{2} \qquad \frac{400}{2} + \frac{160(20)}{2}$$

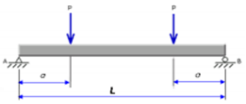
$$= 1800 \text{ lb}$$

$$M = \frac{PL}{4} + \frac{wL^2}{8} \qquad \frac{400(20)}{4} + \frac{160(20)^2}{8}$$

$$10{,}000 \text{ lb}$$

All beams are simply supported and are 20 **feet long**. All uniform loads are **w = 160 lb/ft.**
All concentrated loads are **P = 400 lb.** Find reaction forces and moment.



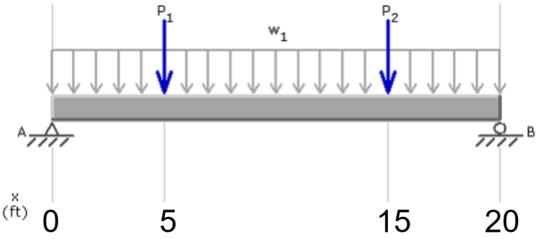


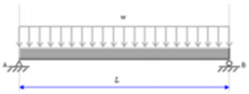
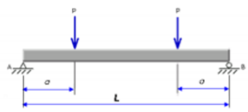
Reaction	$R_A = R_B = P$	(12.7)
Moment	$M_{max} = Pa$	(12.8)
~~**Deflection**~~	$\cancel{\Delta_{max} = \frac{Pa}{24EI}}(3L^2 - 4a^2)$ (at center)	(12.9)

$R_A = R_B = 400$ lb

$m = (400)(5) = 2000$ lbs

All beams are simply supported and are 20 **feet long**. All uniform loads are **w = 160 lb/ft.**
All concentrated loads are **P = 400 lb.** Find reaction forces and moment.



	**Reaction**	$R_A = R_B = \frac{\omega L}{2}$	(12.4)
	Moment	$M_{max} = \frac{\omega L^2}{8}$ (at center)	(12.5)
	~~**Deflection**~~	~~$\Delta_{max} = \frac{5\omega L^4}{384EI}$~~ (at center)	(12.6)
	**Reaction**	$R_A = R_B = P$	(12.7)
	Moment	$M_{max} = Pa$	(12.8)
	~~**Deflection**~~	~~$\Delta_{max} = \frac{Pa}{24EI}$~~$(3L^2 - 4a^2)$ (at center)	(12.9)

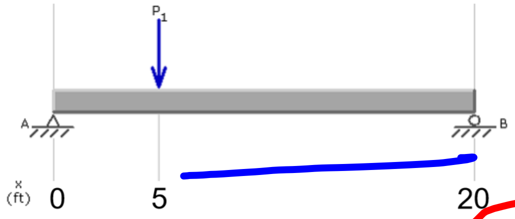
$$RA = RB = \frac{wL}{2} + P \qquad \frac{160(20)}{2} + 400$$

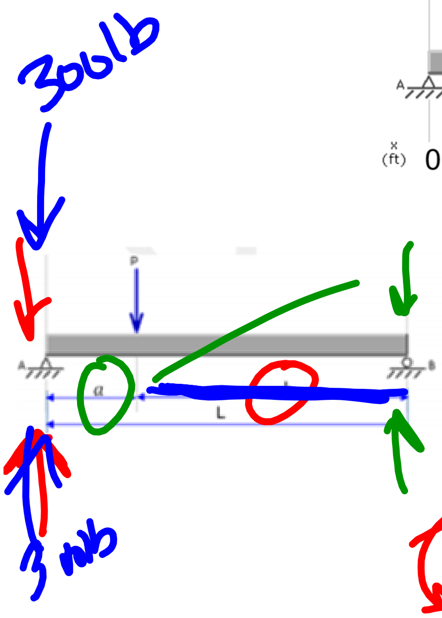
2000 lbs.

$$M = \frac{wL^2}{8} + Pa$$

$$\frac{160(20)^2}{8} + 400(5) = 10{,}000 \text{ lb}$$

All beams are simply supported and are 20 **feet long**. All uniform loads are **w = 160 lb/ft.**
All concentrated loads are **P = 400 lb.** Find reaction forces and moment.





Reaction	$R_A = \frac{Pb}{L}$ **and** $R_B = \frac{Pa}{L}$	(12.10)
Moment	$M_{max} = \frac{Pab}{L}$ (at Point of Load)	(12.11)
~~**Deflection**~~	$\cancel{\Delta_{max} = \frac{Pab(a+2b)\sqrt{3a(a+2b)}}{27EI}}$	~~(12.12)~~
	$\cancel{\left(\text{at } x = \sqrt{\frac{a(a+2b)}{3}} \text{ when } a>b\right)}$	

$$R_A = \frac{(400)(15)}{20} = 300\text{ lb}$$

$$R_B = \frac{400(5)}{20} = 100\text{ lbs}$$

$$M = \frac{400(5)(15)}{20} = 1500\text{ lb}$$