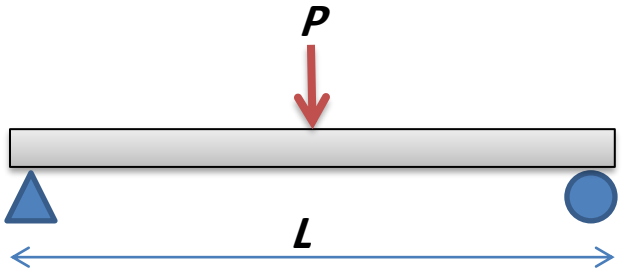
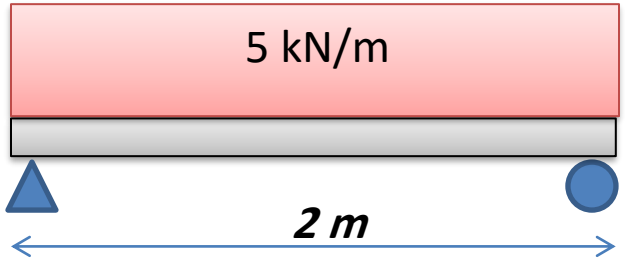
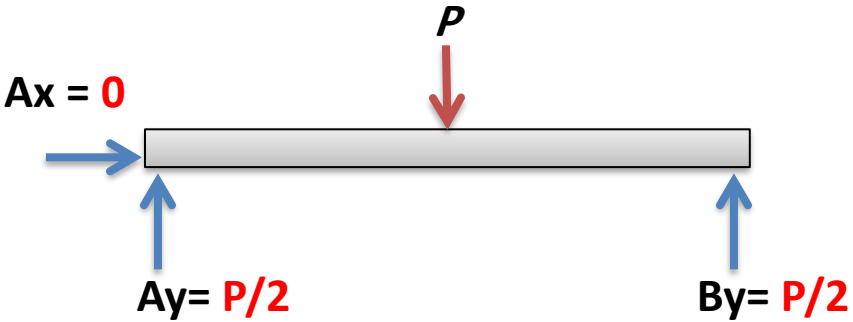
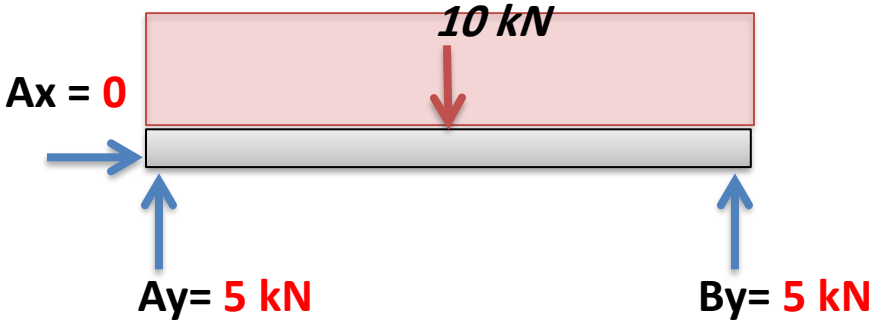
Class: 2nd Class
Subject: Mechanics of Materials
Lecturer: Dr. Ali K. Kareem
E-mail: ali.kamil.kareem@uomus.edu.iq

Lec6: Shear force & Bending moment diagram



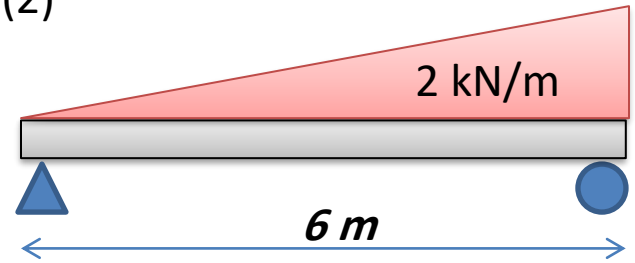


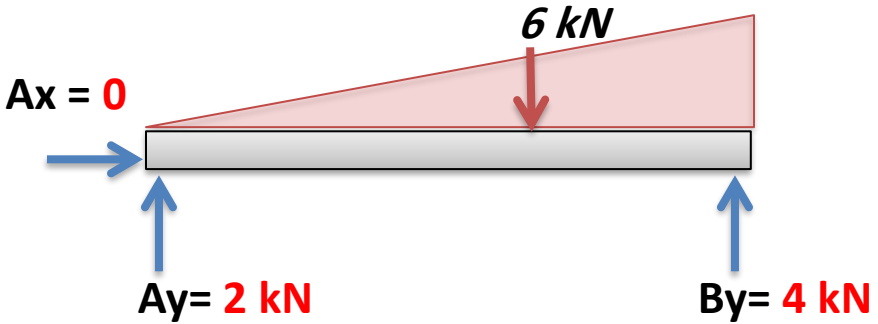




F = (1/2)(6)(2)

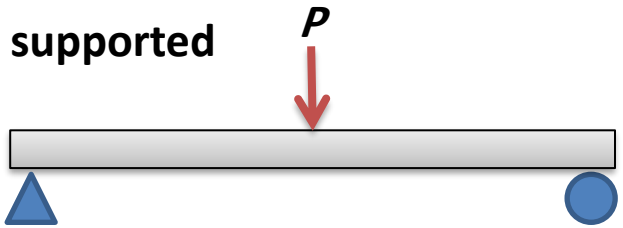
F = 6 kN

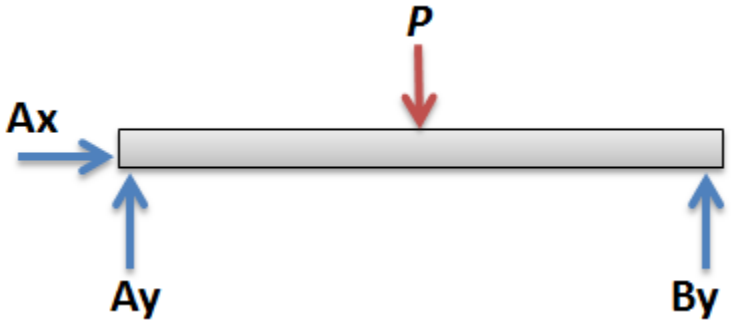




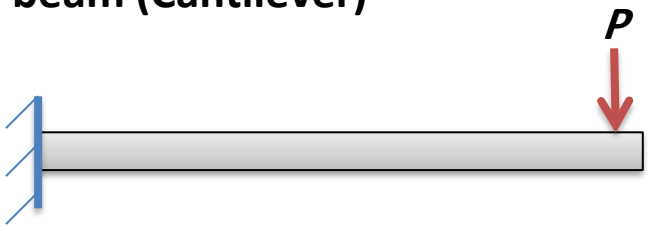
Types of beams:

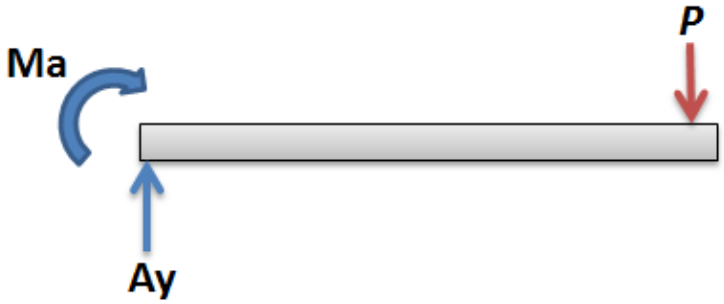
Simply supported



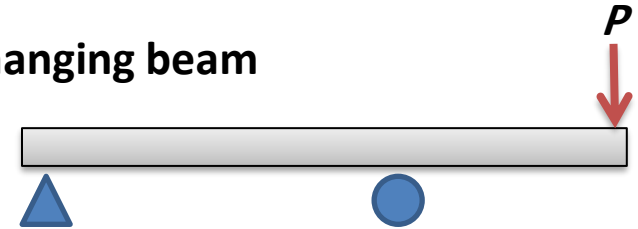


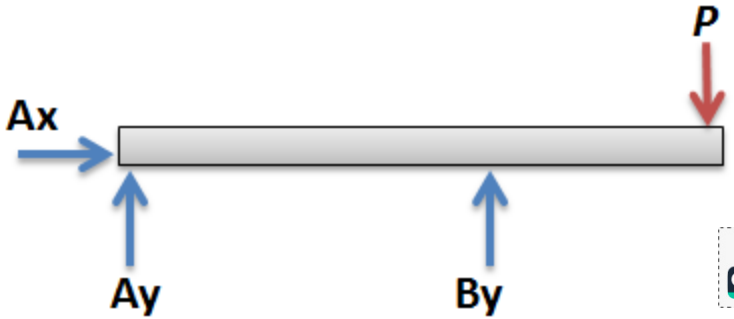
Fixed beam (Cantilever)





Overhanging beam

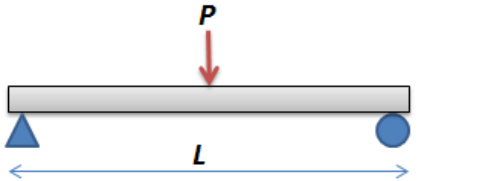


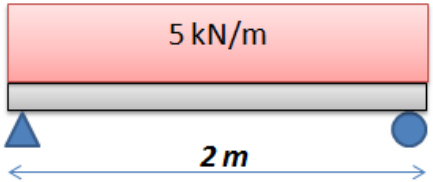


Types of loads

Concentrated Load (single force)

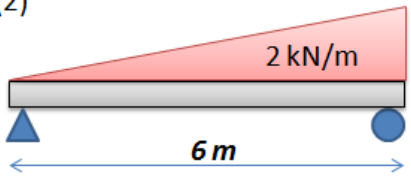
Distributed Load

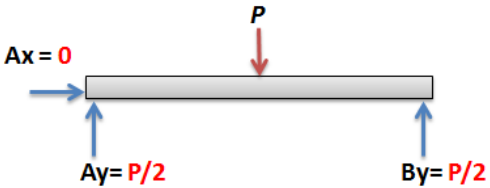


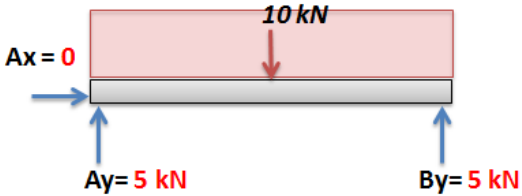


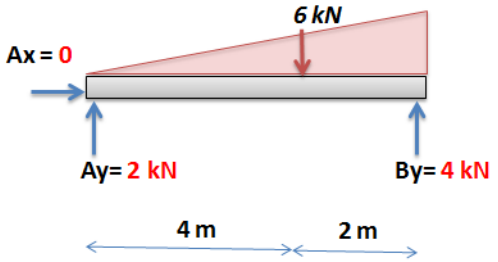
F = (1/2)(6)(2)

F = 6 kN

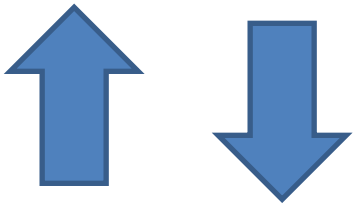




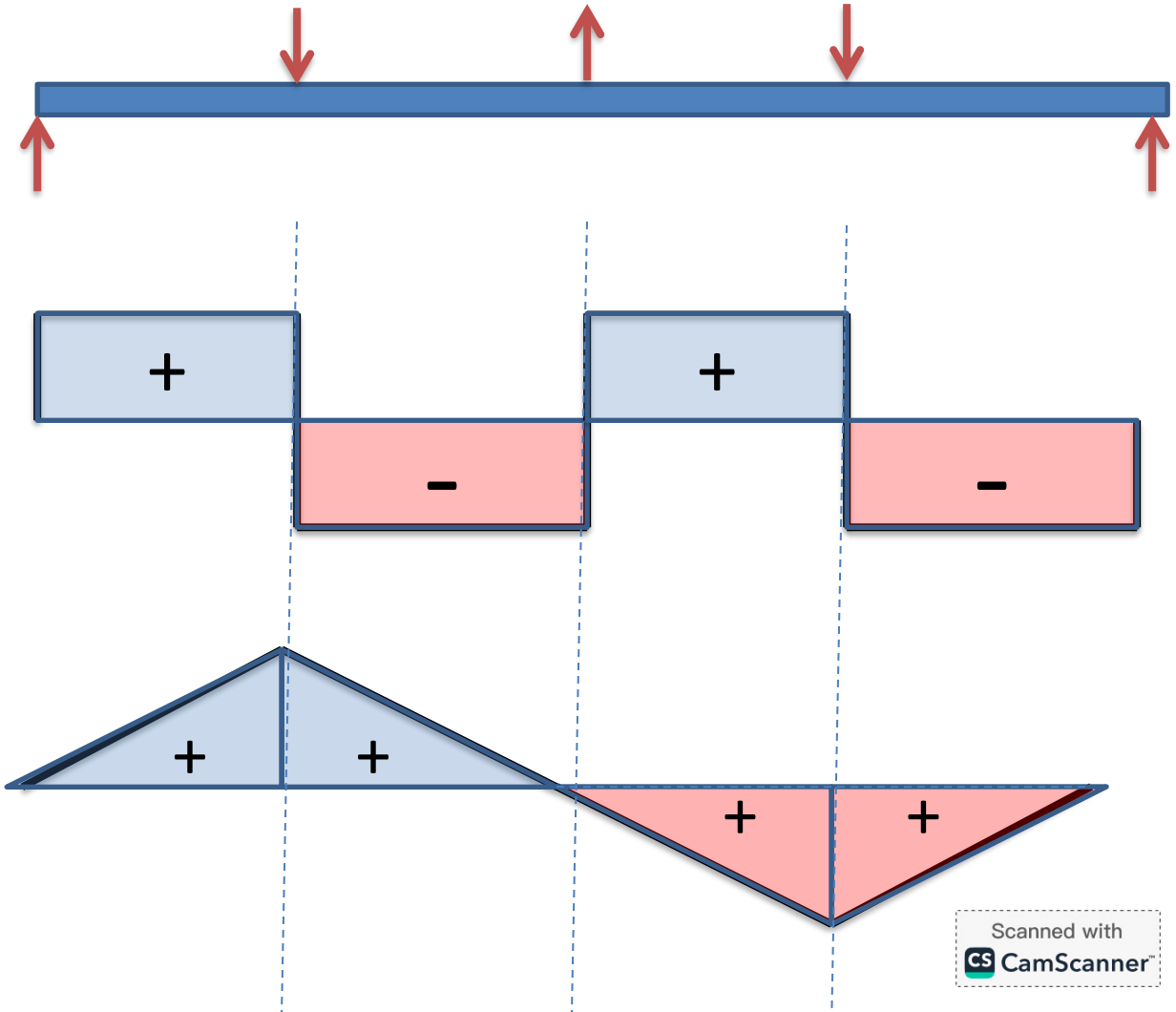


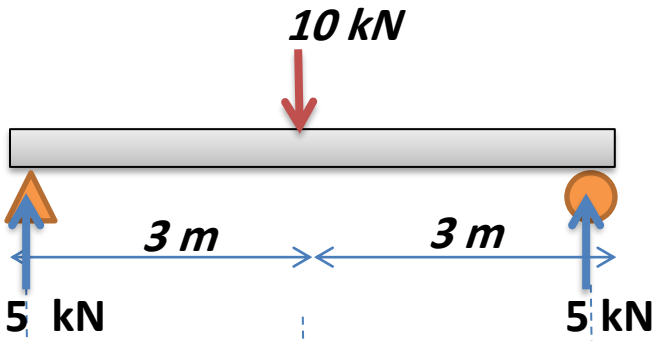


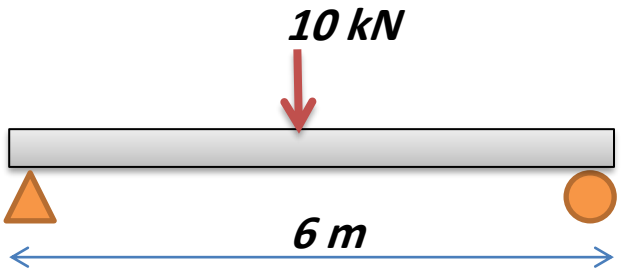
Concentrated Load (single force)

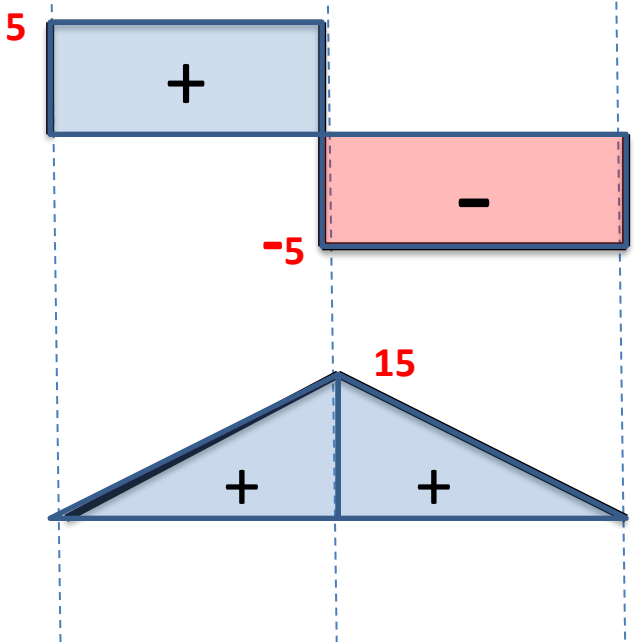


F









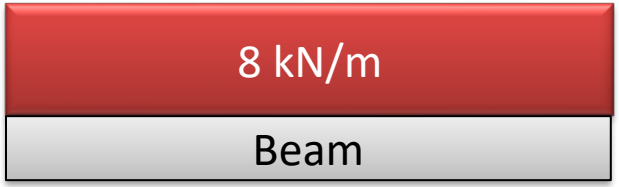
SFD

BMD

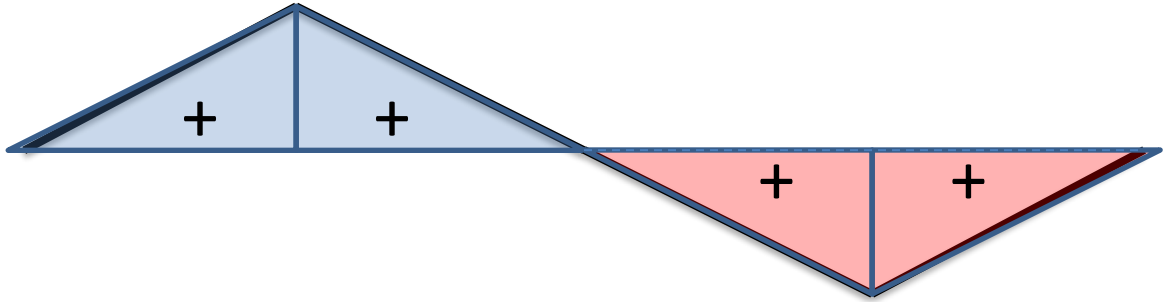
Common Relationships

Load	0	0	Constant
Shear	Constant	Constant	Linear
Moment	Linear	Linear	Parabolic

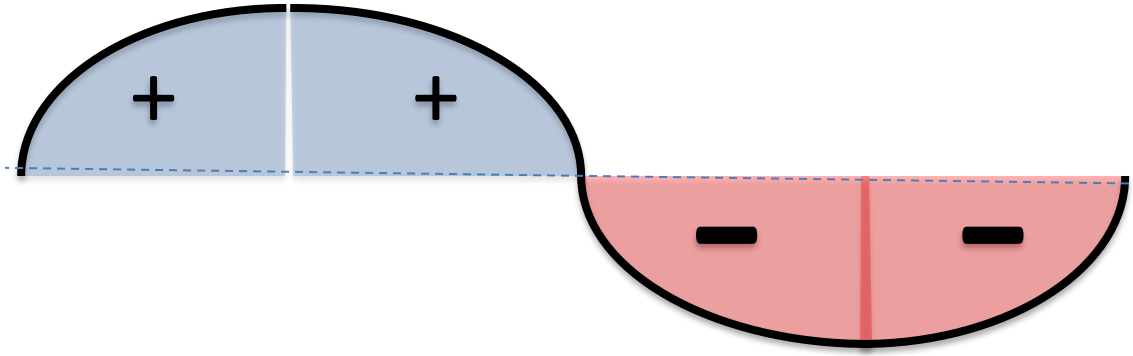
Distributed Load

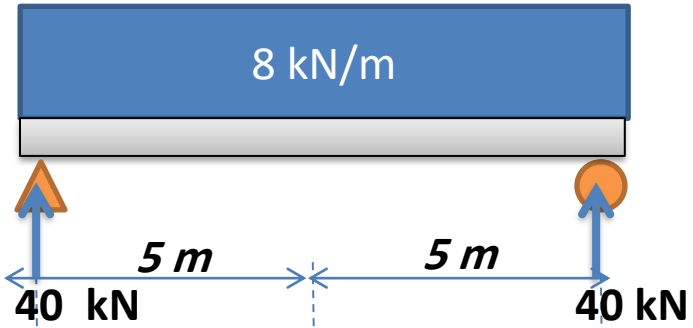


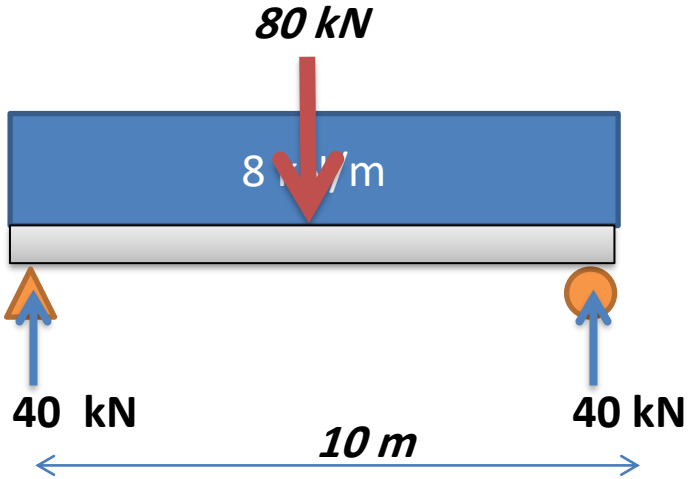
SFD

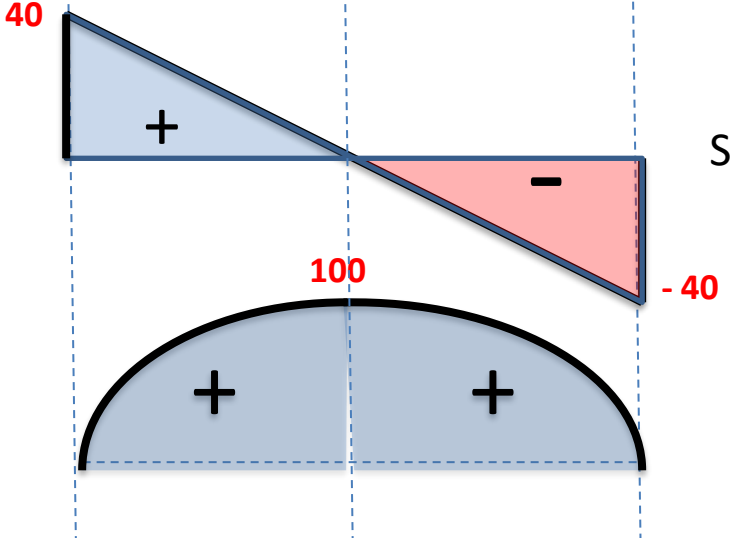


BMD



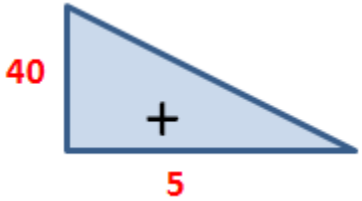






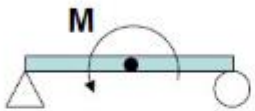
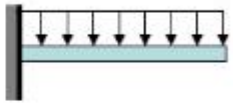
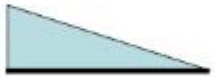
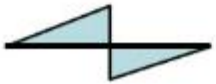
SFD

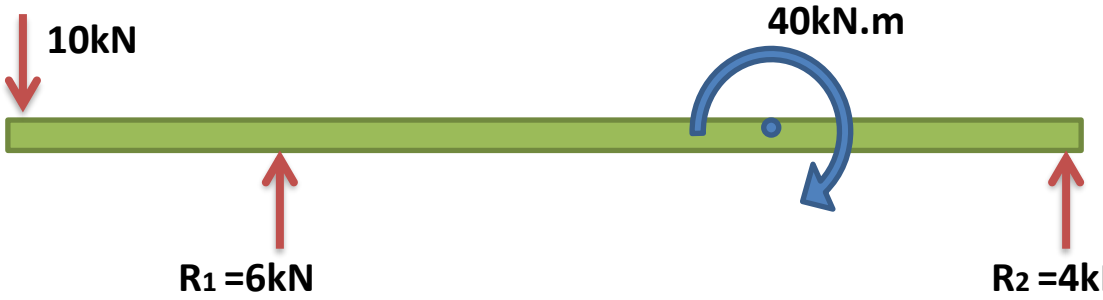
BMD



Area = (1/2)(5)(40) = 100

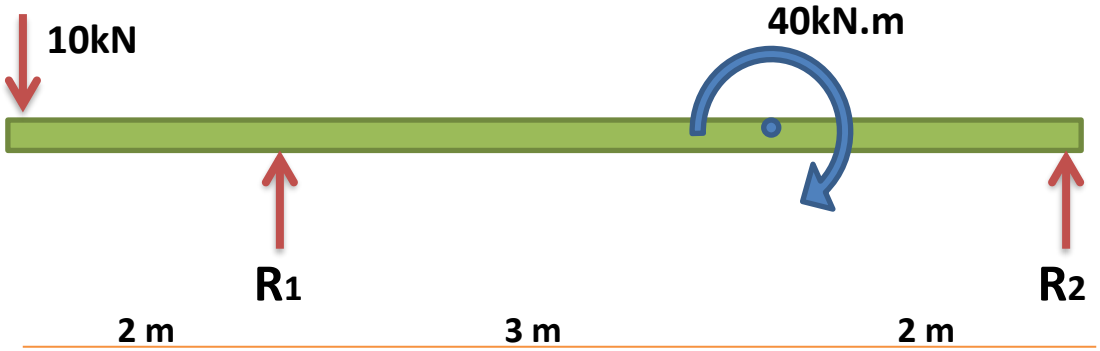
Common Relationships

Load	0 	0 	Constant 
Shear	Constant 	Constant 	Linear 
Moment	Linear 	Linear 	Parabolic 



S.F.D

B.M.D



$$\sum M_{R_2} = 0$$

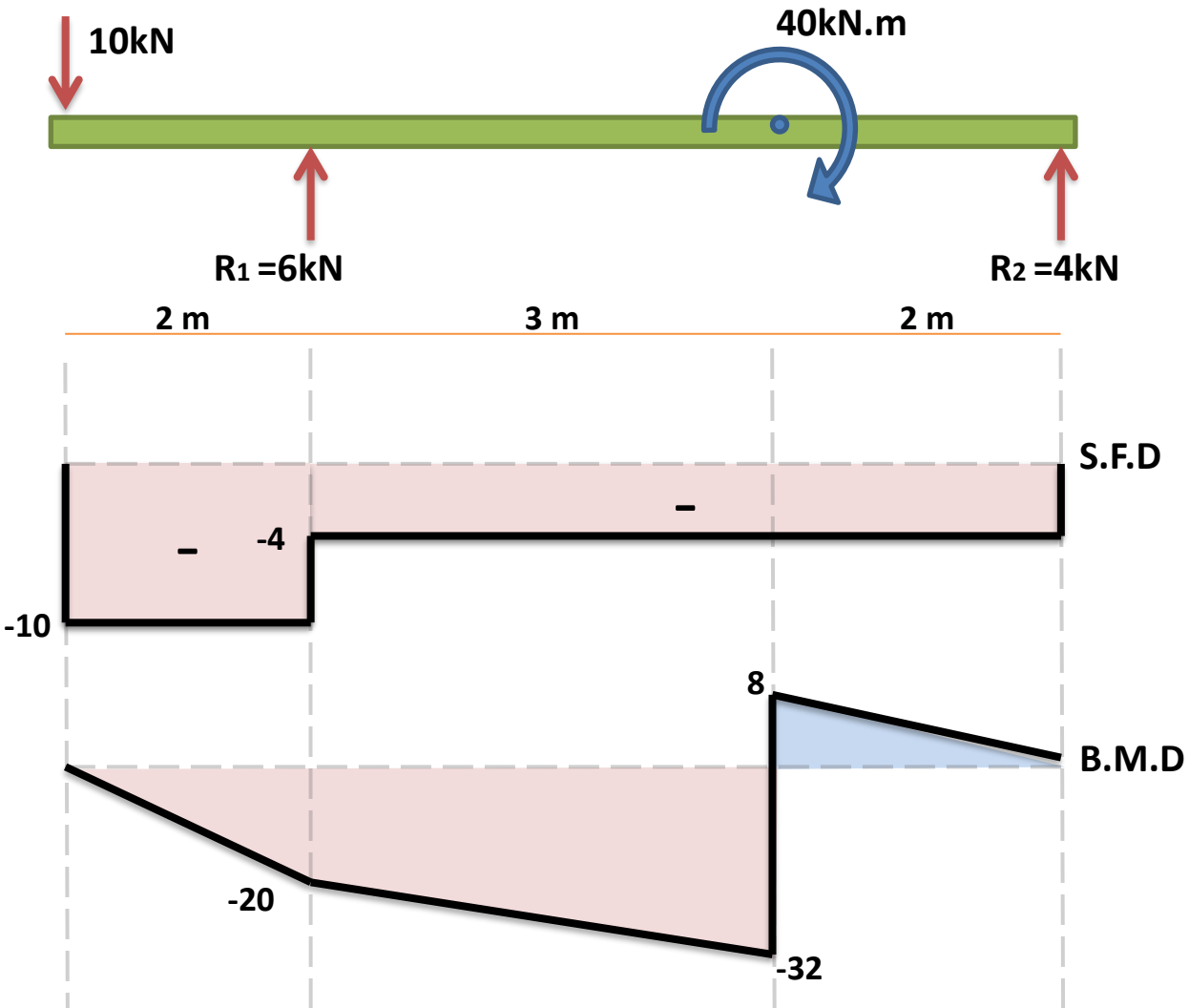
$$40 + R_1(5) - 10(7) = 0$$

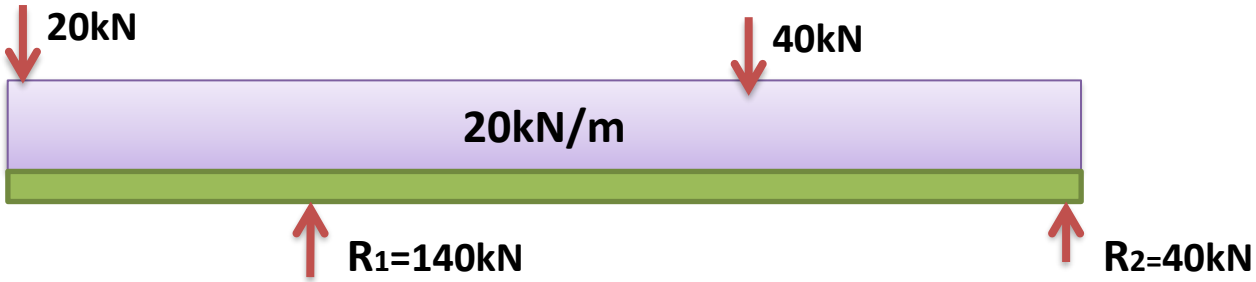
$$R_1 = 6kN$$

$$\sum F_y = 0$$

$$-10 + 6 + R_2 = 0$$

$$R_2 = 4kN$$

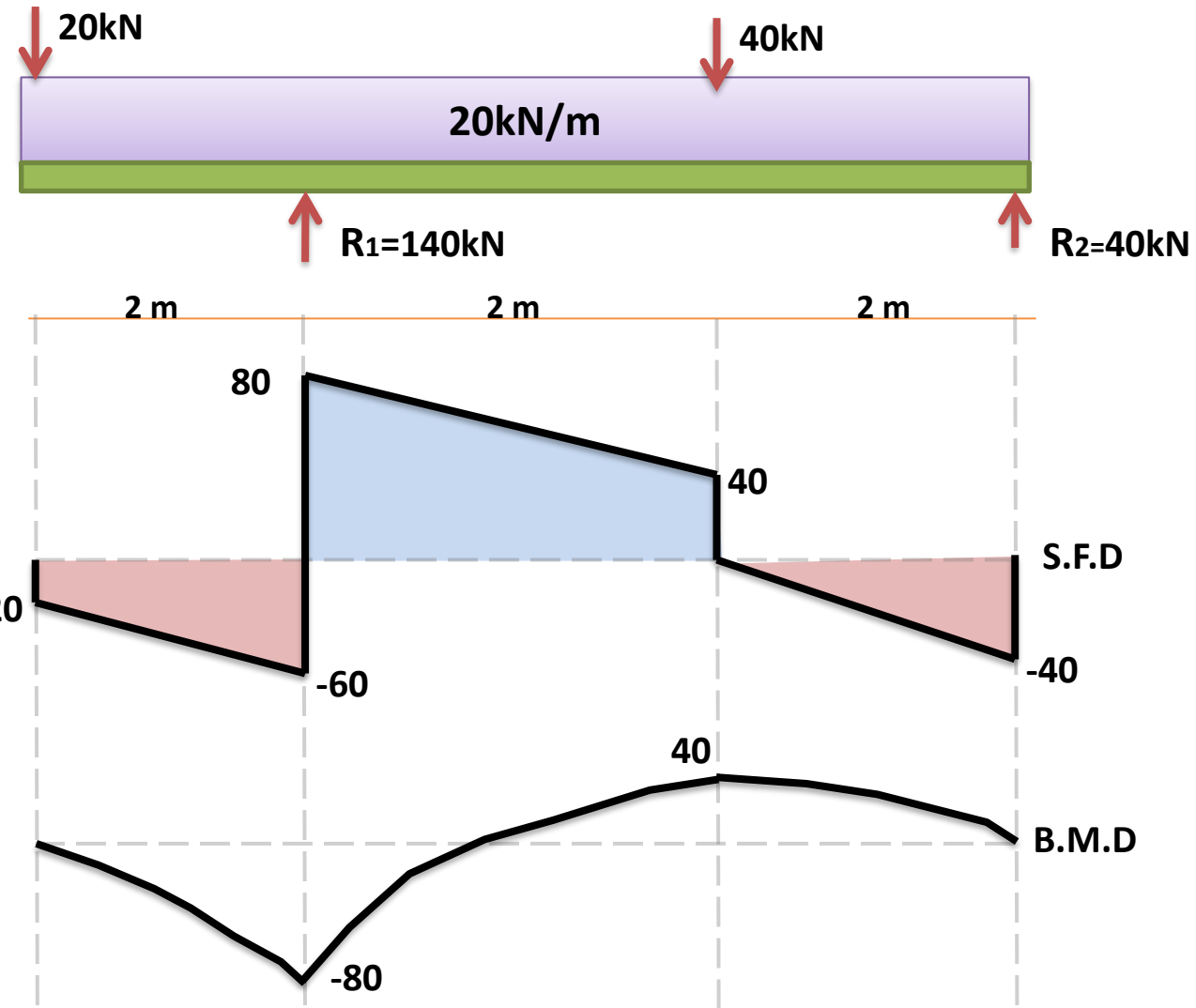


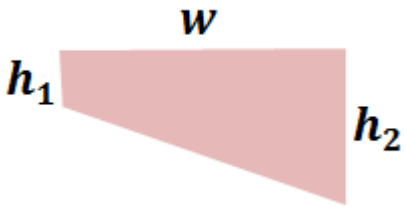


2 m | 2 m | 2 m

S.F.D

B.M.D





$$A = \frac{h_1 + h_2}{2}(w)$$

$$A = \frac{(-20) + (-60)}{2}(2)$$

$$A = -80kN.m$$

H.W