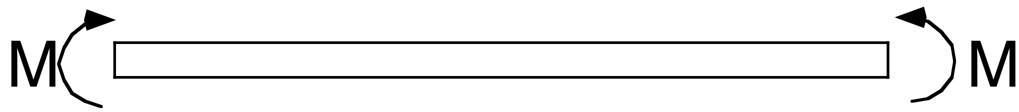
M5 Concept Question 1

A beam is loaded by a pure moment M

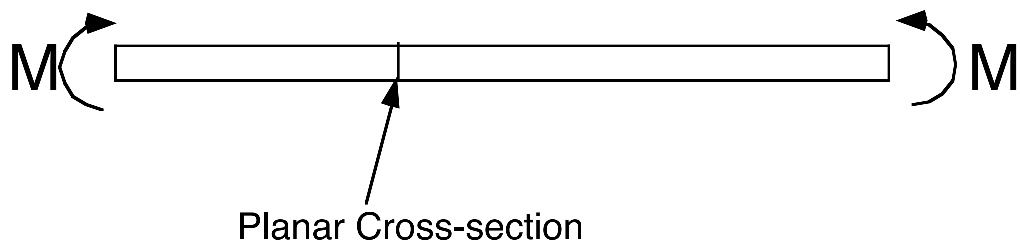


What will be the geometrical shape of the deformed beam due to this loading?

1. A parabola
2. An elliptical arc
3. A circular arc
4. It will remain linear
5. It will depend on the magnitude of M
6. Some other answer
7. I don't know/don't understand

M5 Concept Question 2

A beam is loaded by a pure moment M and deforms into a circular arc



What does this imply about the deformed shape of an a planar cross-section, initially perpendicular to the long axis of the beam (i.e. it is initially vertical)?

1. It will remain planar and vertical
2. It will remain planar and perpendicular to the deformed axis of the beam
3. It will deform into a circular arc
4. It will remain planar
5. It will depend on the magnitude of M
6. Some other answer
7. I don't know/don't understand

M5 Concept Question 3

Given the Euler-Bernoulli assumption for the deformation of beams - "Plane Sections remain plane", and assuming that the deformations are small. Which of the following relationships best describes the axial displacement, u, of a point on the cross-section of a beam which is undergoing a transverse displacement w?

1. $u = \text{constant}$
2. $u = z\dfrac{dw}{dx}$
3. $\dfrac{du}{dz} = -z$
4. $u = -z\dfrac{dw}{dx}$
5. $u = -z\sin\theta$
6. Some other answer
7. I don't know/don't understand.

M5 Concept Question 4

Given a distribution of shear stresses on the rectangular cross-section of a beam, breadth b, height h, the resultant shear force is best given by:

1. $S = bh\tau_{xz}$
2. $S = \int_{-\frac{h}{2}}^{\frac{h}{2}} \tau_{xz} b dz$
3. $S = -bh\tau_{xz}$
4. $S = \int_{-\frac{h}{2}}^{\frac{h}{2}} \int_{-\frac{b}{2}}^{\frac{b}{2}} \tau_{xz} dy dz$
5. $S = -\int_{-\frac{h}{2}}^{\frac{h}{2}} \tau_{xz} b dz$
6. Some other answer
7. I don't know/don't understand.