

Remarks: See § 8.5, pages 633 till 647

Answers:

a) $w_{\max} = 0.011$

b) $w_{\max} = 0.0104$ at $x=3.68$

Explanation:

b) Maple Sheet:

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> #Define the moment distribution in the beam
M:=x-> piecewise(x>=0 and x<=4, -12*x^2/2+36*x , x>4 and
x<=8, 48 +36*(x-4) - 48*(x-4) );
> #loading some useful maple functions
with(Optimization):
> #Defining EI constant
EI:=31000:
> #Bending equation
eq1:= diff(diff( W(x),x),x)=-M(x)/EI;
eq1:=  $\frac{d^2}{dx^2} W(x) = -\frac{1}{31000} \begin{cases} -6x^2 + 36x & 0 \leq x \text{ and } x \leq 4 \\ 96 - 12x & 4 < x \text{ and } x \leq 8 \end{cases}$ 
> #Solving the bending equation
assign( dsolve({eq1, W(0)=0, W(8)=0}));
> #Finding the maximum between x=0 and x=8
Maximize( W(x), x=0..8);
[0.0104065221917049294, [x = 3.67822115205079614]]
```