

# CIV-E4050 Prestressed and Precast Concrete Structures

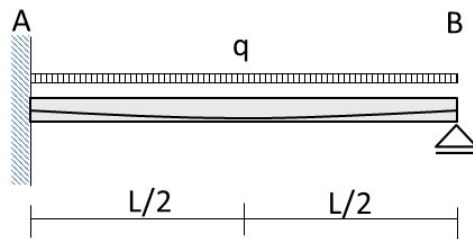
## Examination 21.10.2020 (remote examination using My Course)

A precondition for the participation in the examination is the fulfilment of compulsory parts of the course in the autumn 2020 or earlier.

### Question 3a

Scan your handwritten answers and upload the scanned document as a pdf-file within the period given for this task.

The beam below has a parabolic tendon with the axis of symmetry at the middle of the span. The ends of the tendon lie at the neutral axis. (4p in total).



• A method for determining of the equation for the parabola describing tendon geometry

1)  $y_1 - y_0 = a(x_1 - x_0)^2$  or  $a = (y_1 - y_0) / (x_1 - x_0)^2$   
(in coordinate system  $y = ax^2$ )

2)  $y_y = a(x_x - k)^2 + l$   
(in coordinate system:  $x_x = x + k$ ,  $y_y = y + l$ )

- a) If the approximation  $u''(x) = q/F$  is valid, define the tendon geometry so that the reaction force between tendon and concrete is uniformly distributed along the span. (2p)
- b) Why cannot the approximation  $u''(x) = q/F$  be used for a circular tendon geometry? (2p)