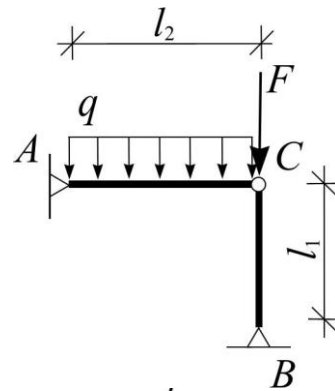


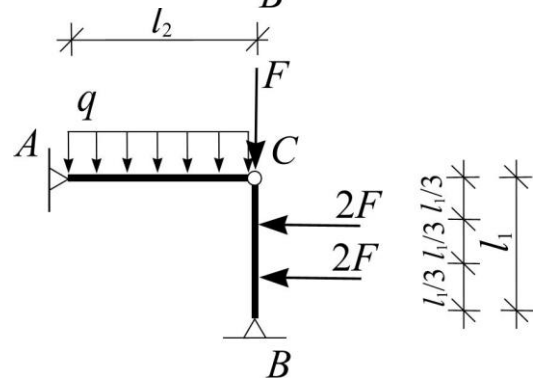
Please solve 2 for extra points. Deadline 28/11/2017

Superposition, loads, turnover

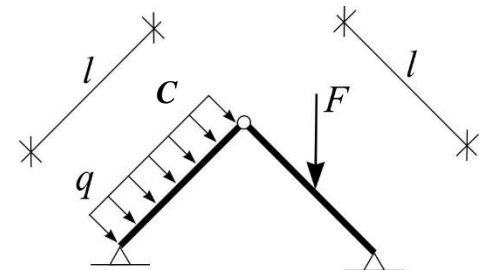
1. Determine the support reactions (directions and magnitudes!) of the three-hinged structure and the connection force in hinge "C" (directions and magnitudes!) if $F=15$ kN, $q=6$ kN/m, $l_1=2,5$ m and $l_2=3,0$ m. Draw a result figure showing the structure itself, the loads and the reaction forces (directions and magnitudes!) on it!



2. Determine the support reactions (directions and magnitudes!) of the three-hinged structure and the connection force in hinge "C" (directions and magnitudes!) if $F=15$ kN, $q=6$ kN/m, $l_1=2,5$ m and $l_2=3,0$ m. **For the solution use the results of the previous problem (use the principle of linear superposition!)** Draw a result figure showing the structure itself, the loads and the reaction forces (directions and magnitudes!) on it!

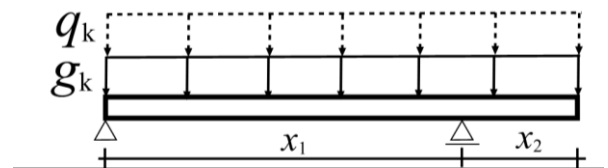


3. Determine the support reactions (directions and magnitudes!) of the three-hinged structure and the connection force in hinge "C" (directions and magnitudes!) if $F=25$ kN (acting in the middle of the bar), $q=3$ kN/skew meter!, $l=3$ m and the slope of the bars are 45° (i.e. in joint „C“ the angle is 90°). Draw a result figure showing the structure itself, the loads and the reaction forces (directions and magnitudes!) on it!



4. The figure shows the mechanical model of a timber beam.

- Which load scheme should we use if we want to determine the maximal support reaction in the *pin joint* support? Calculate this maximal support reaction!
- Which load scheme should we use if we want to determine the maximal support reaction in the *roller* support? Calculate this maximal support reaction!
- Is it possible that the beam lifts off from the pin joint support if we do not tie them together?



Data: $x_1= 4,00$ m, $x_2= 2,00$ m, $t=1,20$ m, $g_k= 1,50$ kN/m, $q_k= 4,00$ kN/m.

Safety factors: dead load: $\gamma_G=0.9$ or $1,35$, live load: $\gamma_G=0,9$ or $1,35$.

Remark: In the case of the dead loads the same safety factor should be used for the whole beam in a given load scheme (unlike in the exercise that we had in class!)