Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Student number\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Assignment 4 (4p)**

Consider the curved beam rigidity problem on page 1-4 to 1-8 of the lecture notes. Use the curved beam equations on page 1-6 with hand calculations or Mathematica to find the analytical solution to the vertical displacement  as the function of mass *m* used as loading. Use the expression to deduce the coefficient  of

.

In the expression, *g* is the acceleration by gravity, *R* is the radius,  the second moment of cross section with respect to the area centroid, and *E* is the Young’s modulus of the rim material. The specific form above is based on dimension analysis and additional assumptions of linearity and vanishing displacement without external loading.