

Exam 1(January 29, 2003)

MAC2312 Analytic Geometry and Calculus II (F. Lübeck)

- (1) (*5 points*) Consider the curves $y = x + 1$, $y = \cos(x)$ and $x = \frac{3}{2}\pi$ for $x \in [0, \frac{3}{2}\pi]$. Sketch their graphs and compute the area they enclose.
- (2) (*5 points*) Sketch the area enclosed by the graphs of $y = \ln(x)$, $y = 0$ and $x = 3$. Consider the solid obtained by rotating this area about the y -axis. Compute its volume, using the cylindrical shell method.
- (3) (*5 points*) Compute the volume of the solid in exercise (2) again, but now using the slicing method.
- (4) (*5 points*) A spring has a natural length of 50 cm. To stretch it to the length of 1 m a work of 25 J is needed. Compute the work needed to stretch the spring to a length of 75 cm. (Don't forget to write the correct units in your computation.)