

1. (24 pts) Consider the region  $R$  in the first quadrant bounded above by  $y = \cosh x$ , below by  $y = 1$ , and on the right by  $x = \ln 2$ .
- (a) Sketch and shade the region  $R$ .
- (b) Set up but do not evaluate integrals to determine each of the following:
- I. The volume of the solid generated by rotating  $R$  about the  $y$ -axis.
  - II. The volume of the solid generated by rotating  $R$  about the line  $y = 3$ .
  - III. The length of the curve  $y = \cosh x$  for  $0 \leq x \leq \ln 2$ . (Simplify the integrand, eliminating all square roots.)
2. (14 pts) Find the surface area when 1. ( 24the