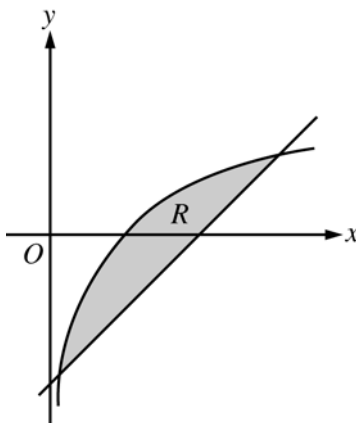


**2006 AP<sup>®</sup> CALCULUS AB FREE-RESPONSE QUESTIONS**

**CALCULUS AB**  
**SECTION II, Part A**  
**Time—45 minutes**  
**Number of problems—3**

A graphing calculator is required for some problems or parts of problems.

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1. Let  $R$  be the shaded region bounded by the graph of  $y = \ln x$  and the line  $y = x - 2$ , as shown above.
    - (a) Find the area of  $R$ .
    - (b) Find the volume of the solid generated when  $R$  is rotated about the horizontal line  $y = -3$ .
    - (c) Write, but do not evaluate, an integral expression that can be used to find the volume of the solid generated when  $R$  is rotated about the  $y$ -axis.
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**WRITE ALL WORK IN THE PINK EXAM BOOKLET.**