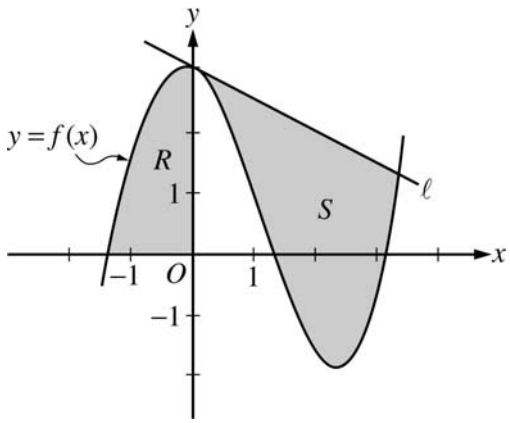
CALCULUS AB
SECTION II, Part A
Time—45 minutes
Number of problems—3

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



1. Let f be the function given by $f(x) = \frac{x^3}{4} - \frac{x^2}{3} - \frac{x}{2} + 3\cos x$. Let R be the shaded region in the second quadrant bounded by the graph of f, and let S be the shaded region bounded by the graph of f and line ℓ, the line tangent to the graph of f at $x = 0$, 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 $y = -2$.
   (c) Write, but do not evaluate, an integral expression that can be used to find the area of S.

WRITE ALL WORK IN THE EXAM BOOKLET.