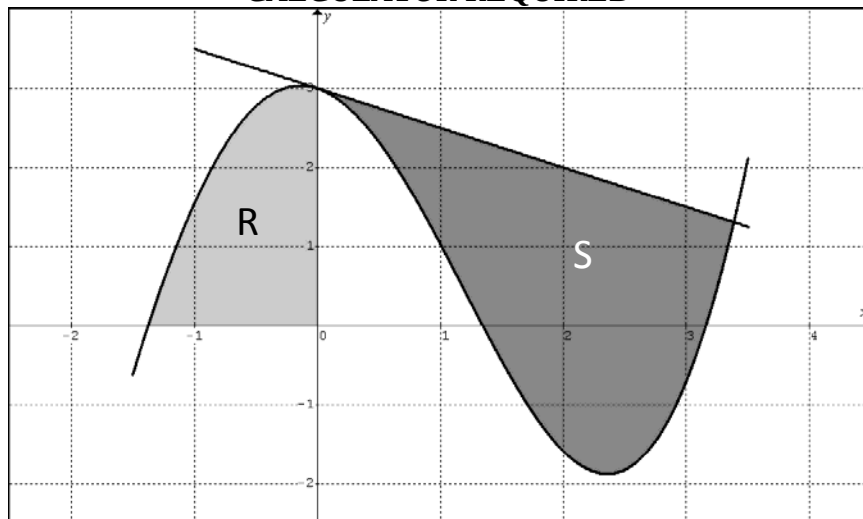


REVIEW PREPACKAGE
PROBLEM #10
AP YEAR: MIX/MADE AP#MIX

-----***CALCULATOR REQUIRED***-----



1. Let f be the function $f(x) = \frac{x^3}{4} - \frac{x^2}{3} - \frac{x}{2} + 3\cos x$. 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 the line ℓ , the line tangent to the graph of f at $x = 0$, as shown above.

- (a) Find the area of region R .
- (b) Find the volume of the solid generated when R is rotated about the horizontal line $y = -2$.
- (c) The region R is the base of a solid. Every cross section perpendicular to the x -axis is an equilateral triangle whose side lies flat on R . Write, but do not evaluate, an expression involving one or more integrals that can be used to find the volume of the solid.
- (d) Write, but do not evaluate an expression involving one or more integrals used to find the perimeter of region R .
- (e) Write, but do not evaluate, an integral expression that can be used to find the area of S .
- (f) Consider the function $g(x) = \int_{-1}^x f(t)dt$. Find the length of g on $-1 \leq x \leq 0$.