

Calculus (AB and BC) Sample Problems

1) Differentiate the following functions to find dy/dx : 2) Integrate the following functions to find $y=f(x)$:

a. $f(x) = \frac{(x+3)\ln x}{(2x-1)^3}$

a. $dy = x \sin x^2 dx$

b. $f(x) = 3e^x + 2e^{-2x} + e$

b. $dy = x \ln(x) dx$

c. $f(x) = \sec^2(2x^2 + 3) \tan x^3$

c. $dy = \frac{4x \cdot dx}{(x-3)(x^2+4) \cdot (x+2)^2}$

d. $x^3 + y^2 + 4x - 2y = 6$

d. $dy = \frac{dx}{4x^2 + 9}$

3) $f(x) = x^2$
 $g(x) = x$

a. Find the area enclosed by the two functions above.

b. Find the volume of the solid formed when the area found in part a. is rotated around:

i. the x-axis

ii. the y-axis

iii. the line $x=4$

4) The top of a 10 meter long ladder rests diagonally against a wall. How fast is the top of the ladder descending the wall when the bottom of the ladder is 6 feet from the bottom of the wall and being pulled away from the wall at 9 meters per second?