

MATHEMATICS

Use of correct mathematical notation 1.0 point

Problem 1 2.0 points

Calculate $\int \ln^2(2x) dx$

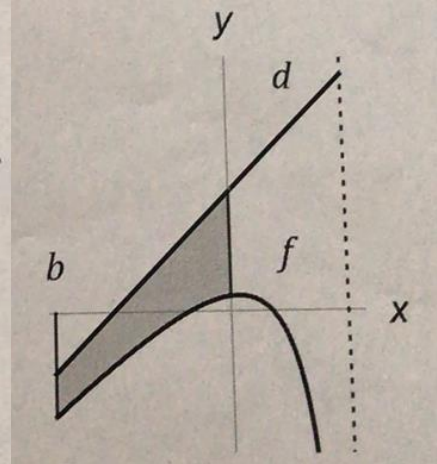
Hint $\int \ln(2x) dx = x \cdot \ln(2x) - x$

Problem 2 3.0 points

Consider the function f defined by $f(x) = \frac{2x^2 - 1}{2x - 4}$.

Let d be the asymptote to infinity of f .

- Find the equation of d . Justify.
- The area of the shaded surface is 10.
Calculate the value of $b < 0$.



Problem 3 4.0 points

Consider the function f defined by $f(x) = \frac{5 \cdot e^x}{e^{2x} + 4}$.

The rotation about the x -axis of the shaded surface generates a solid of revolution.
Calculate the volume of this solid.

Hint $e^{2x} = (e^x)^2$ and use an integration by substitution.

