Class Drill 9 Derivatives of Functions Containing Logarithms

(A) Let \( f(x) = 12 \ln \left( \frac{13}{x} \right) \). Find \( f'(x) \). (Start by rewriting \( f \) using a rule of logarithms.)

(B) Let \( f(x) = 12 \ln(x^{13}) \). Find \( f'(x) \). (Start by rewriting \( f \) using a rule of logarithms.)

(C) Let \( f(x) = 12x \ln(13) \). Find \( f'(x) \).

(D) The goal is to find the equation of the line tangent to the graph of the function \( f(x) = 5 + \ln(x^3) \) at the point where \( x = e^2 \).
Remember that the approach is to build the general form of the equation for the tangent line:

\[
(y - f(a)) = f'(a) \cdot (x - a)
\]

Get Parts

Identify the number \( a \).

Find \( f(a) \).

Question (D) continues on the next page.
Find $f'(x)$. Hint: Start by rewriting $f$ using a rule of logarithms.

Find $f'(a)$.

Substitute Parts Into the General Tangent Line Equation

Convert the Equation to Slope Intercept Form