

Integration by Substitution

Date _____ Period _____

Evaluate each indefinite integral. Use the provided substitution.

1) $\int \frac{20x^4}{4x^5 + 3} dx; u = 4x^5 + 3$

2) $\int 36x^2 e^{4x^3 + 3} dx; u = 4x^3 + 3$

3) $\int 80x^3 \cdot 3^{5x^4 - 2} dx; u = 5x^4 - 2$

4) $\int \frac{2}{x(-1 + \ln 4x)} dx; u = -1 + \ln 4x$

Evaluate each indefinite integral.

5) $\int \frac{12x^2}{x^3 + 2} dx$

6) $\int \frac{20e^{5x}}{e^{5x} + 3} dx$

7) $\int 10 \sin -2x \cdot e^{\cos -2x} dx$

8) $\int \frac{5e^{-3 + \ln 3x}}{x} dx$

Differentiation - Natural Logs and Exponentials

Date_____ Period____

Differentiate each function with respect to x .

1) $y = \ln x^3$

2) $y = e^{2x^3}$

3) $y = \ln \ln 2x^4$

4) $y = \ln \ln 3x^3$

5) $y = \cos \ln 4x^3$

6) $y = e^{e^{3x^2}}$

7) $y = e^{(4x^3 + 5)^2}$

8) $y = \ln 4x^2 \cdot (-x^3 - 4)$

9) $y = \ln \left(-\frac{4x^4}{x^3 - 3} \right)^5$

10) $y = \frac{e^{5x^4}}{e^{4x^2 + 3}}$