

AP Calculus: Practice Differentiation involving  $\ln$ ,  $e^x$  and 5.5

Find the derivative of:

1.  $f(x) = (3x)^{3x}$

2.  $f(x) = \frac{2^x}{e^x}$

3.  $f(x) = \ln(3^x)$

4.  $f(x) = \sqrt{x} \cdot \log_3 x$

5.  $f(x) = x^{2x}$

6.  $f(x) = 5^{5x}$

7.  $f(x) = e^e$

8.  $f(x) = e^{ex}$

9.  $f(x) = x^e$

10.  $f(x) = x^{ex}$

11.  $f(x) = e^2 \ln x$

12.  $f(x) = \log_4 \sqrt{x^2 - x}$

13.  $f(x) = \ln \frac{(2x^2)\sqrt{x}}{e^{-x}}$

14.  $f(x) = (2^{2x})e^{-x}$

Find the following integrals:

15.  $\int 2^{2x} dx$

16.  $\int \frac{1}{x \ln x^2} dx$

17.  $\int \frac{e^{2x}}{e^{2x} + 1} dx$