§5.5: Derivatives other than *e*
"I WILL …
…solve log and exponential derivatives."

I. Review

A. To Rewrite Logarithms

1. $a^u = b$ is $\log_a b = u$
2. a = Base
3. u = Power
4. b = Value/Argument

B. Change of Base Formula

1. $\log_b x = \frac{\log x}{\log b} or \frac{\ln x}{\ln b}$

Ex 1: Rewrite $2^4 = 16$ into log form and evaluate	Ex 2: Rewrite $x^2 - x = \log_3 9$ into log form and evaluate
Your Turn: Rewrite $3x + 5 = \log_2 64$ into log form and evaluate	

C. Log Derivative Rules

1. $\frac{d}{dx}[\ln(u)] =$ _____, $u > 0$
2. $\frac{d}{dx}[\log_a u\,] =$ _____

Ex 3: Solve for the derivative of $y = \log_7 x$	Ex 4: Solve for the derivative of $y = \log_{10}(x^3 + x)$
Ex 5: Solve for the derivative of $y = \log_3(\sin t)$	Your Turn: Solve for the derivative of $y = \log_3(x^2 + 1)$

D. Exponential Derivative Rule: _____

Ex 6: Solve for the derivative of $y = 2^x$

Ex 7: Solve for the derivative of $y = 2^{x^3}$

Ex 8: Solve for the derivative of $y = x(6^{-x})$

Your Turn: Solve for the derivative of $y = 3^{x-4}$

AP 1) Find an equation of the tangent line to the graph of $y = 6^{-x}$ at the point $(-1,\ 6)$.

(A) $y = 6 - \frac{(x+1)\ln 6}{6}$

(B) $y = 6\big(1 - \ln(6)(x+1)\big)$

(C) $y = 6\big(1 - \ln(6)(x-1)\big)$

(D) $y = 6\big(1 + \ln(6)(x+1)\big)$

Vocabulary	Process and Connections	Answer and Justifications

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