Calculus AB **Logs and Exponentials Derivatives Unit Quiz Review WS 2**

1. Find $\frac{dy}{dx}$ $\qquad y = \ln\sqrt[5]{\frac{1-x^3}{4x^2-x}}$

2. Find $\frac{dy}{dx}$ $\qquad y = \sqrt[x]{(3+4x^2)^5}$

3. Given that $f\big(g(x)\big) = x$.
   Find $f'(6)$ if $g(6) = 3$, $g(3) = 6$,
   $g'(3) = -\frac{1}{4}$ and $g'(6) = 2$

4. $f(x) = x^3 - 2x^2 + 1$ $\qquad$ Find $(f^{-1})'(-15)$

Find $\frac{dy}{dx}$ *for the following*

5.

$$y = 2\log\left(\frac{\sqrt[4]{(3x-2x^4)^3}}{2x^3}\right)$$

6. $f(x) = 3^{4x}\left(\log_4(5 - \sqrt[3]{x}) \right)$

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7. Use Log differentiation to find the derivative dy/dx

$$y = \frac{x^2\sqrt{3x - 2}}{(x + 1)^2}$$

8. Find dy/dx $\quad 4xy + \ln x^2y = 7$

9) Find the tangent line equation for the function below at the given point:

$$y = xe^x - e^x, \quad (1, 0)$$

Properties and Derivative Rules to Know

0) Derivative Power Rule:

$$\frac{d}{dx} u^n = n * u^{n-1} * u'$$

B. Logs and Exponential Derivatives

1) $\dfrac{d}{dx} \ln u = \dfrac{u'}{u}$

2) $\dfrac{d}{dx} e^u = e^u * u'$

3) $\dfrac{d}{dx} \log_a u = \left(\dfrac{1}{\ln a}\right) \dfrac{u'}{u}$

4) $\dfrac{d}{dx} a^u = (\ln a)\, a^u * u'$

Log and Exponential Properties to know

$\ln e = 1$	$\ln 1 = 0$	$\ln e^x = x$
$e^{\ln x} = x$	$\ln(ab) = \ln a + \ln b$	$\ln\left(\dfrac{a}{b}\right) = \ln a - \ln b$
$\ln a^n = n * \ln a$	$\ln\left(\dfrac{ab}{cd}\right) = \ln a + \ln b - \ln c - \ln d$	

Derivative Rules to Know (**Blank**)

0) <u>Derivative Power Rule</u>:

$$\frac{d}{dx} u^n =$$

<u>B. Logs and Exponential Derivatives</u>

1) $\dfrac{d}{dx} \ln u =$

2) $\dfrac{d}{dx} e^u =$

3) $\dfrac{d}{dx} \log_a u =$

4) $\dfrac{d}{dx} a^u =$