

1. Find $\frac{dy}{dx}$ $y = \ln \sqrt{\frac{3-2x}{4x}}$

2. Find $\frac{dy}{dx}$ $y = x^{\sqrt{x+3}}$

3. Given that $f(g(x)) = x$.
Find $f'(2)$ if $g(2) = 5$, $g(7) = 2$,
 $g'(2) = 3$ and $g'(7) = -\frac{5}{6}$

4. $f(x) = x^3 + 2x^2 - 3$ Find $(f^{-1})'(13)$

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

5.
$$y = 2 \ln \left(\frac{\sqrt[4]{(3x-2x^4)^3}}{2x^3} \right)$$

6. $y = x^3 e^{5x^2+3x}$

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

7. $y = 2\log_8 \sqrt{x - e^x}$

8. $f(x) = 2^{3x}(\log(2 - \sqrt{x}))$

9. $f(x) = \log_2 \left(\frac{\sqrt{1-3x}}{(x-5x^2)} \right)$

10. $f(x) = 11^{\sqrt[3]{4x-5x^3-3e^2}}$

11. Find dy/dx $\ln\left(\frac{y}{\sqrt{x}}\right) + xy - y + 2x^5 = 3$

12) Find the tangent line equation for the function $f(x) = e^{-x}(\ln x)$ at $(1, 0)$

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

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

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

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

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

Log and Exponential Properties to know

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

Derivative Rules to Know (Blank)

0) Derivative Power Rule:

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B. Logs and Exponential Derivatives

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

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

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