Derivatives of Logarithmic Functions

1. Suppose $f(1)=2$, $f'(1)=3$, and $f'(2)=4$. Then $\left(f^{-1}\right)'(2)=?$

A. $-\frac{1}{3}$

B. $-\frac{1}{4}$

C. $\frac{1}{4}$

D. $\frac{1}{3}$

E. cannot be determined

2. Suppose $y=f(x)=2x^3-3x$. If $h(x)$ is the inverse function of *f*, then $h'(-1)$ = ?

A. -1

B. $\frac{1}{5}$

C. $\frac{1}{3}$

D. 1

E. 3

3. If $f(x)=x^3-3x^2+8x+5$ and $g(x)=f^{-1}(x)$, then $g'(5)=?$

A. 8

B. $\frac{1}{8}$

C. 1

D. $\frac{1}{53}$

E. 53

4. Find $\frac{dy}{dx}$ if $y=\ln(\sec x+\tan x)$.

A. $\frac{dy}{dx}=\sec x$

B. $\frac{dy}{dx}=\frac{1}{\sec x}$

C. $\frac{dy}{dx}=\tan x+\frac{\sec^2 x}{\tan x}$

D. $\frac{dy}{dx}=\frac{1}{\sec x+\tan x}$

E. $\frac{dy}{dx}=-\frac{1}{\sec x+\tan x}$

5. Find $\frac{dy}{dx}$ if $y = \ln\left(\sqrt{x^2+1}\right)$.

A. $\frac{dy}{dx} = \frac{1}{\sqrt{x^2+1}}$

B. $\frac{dy}{dx} = \frac{2x}{\sqrt{x^2+1}}$

C. $\frac{dy}{dx} = \frac{1}{2\left(x^2+1\right)}$

D. $\frac{dy}{dx} = \frac{x}{x^2+1}$

E. $\frac{dy}{dx} = \frac{2x}{x^2+1}$

6. Find $\frac{dy}{dx}$ if $y = \ln\left(\frac{e^x}{e^x-1}\right)$

A. $\frac{dy}{dx} = x - \frac{e^x}{e^x-1}$

B. $\frac{dy}{dx} = \frac{1}{e^x-1}$

C. $\frac{dy}{dx} = -\frac{1}{e^x-1}$

D. $\frac{dy}{dx} = 0$

E. $\frac{dy}{dx} = \frac{e^x-2}{e^x-1}$

7. Find $\frac{dy}{dx}$ if $y = x\ln^3 x$

A. $\frac{dy}{dx} = \frac{3\ln^2 x}{x}$

B. $\frac{dy}{dx} = 3\ln^2 x$

C. $\frac{dy}{dx} = 3\ln^2 x + \ln^3 x$

D. $\frac{dy}{dx} = 3(\ln x + 1)$

E. None of these