Sudoku Puzzle with Derivatives
(Basic derivative formulas, Chain Rule, Implicit differentiation)
A Puzzle by David Pleacher

Solve the 26 derivative problems below and place the answer in the corresponding cell (labeled A, B, C, … Y, Z). Your answers should be integers from 1 to 9 inclusive. Then solve the resulting SUDOKU puzzle.

The rules of Sudoku are simple.
Enter digits from 1 to 9 into the blank spaces.
Every row must contain one of each digit.
So must every column, and so must every 3x3 square.
Each Sudoku has a unique solution that can be reached logically without guessing.

Thanks to Angelica Vialpando and her students for finding the error in Clue #X.

A. Determine $\frac{d}{dx}(8x) =$

B. Given $y = x^3 - x^2 + x - 4$, determine the value of $\frac{dy}{dx}$ when $x = -1$.

C. Determine the value of $\left.\frac{dy}{dx}\right|_{x=4}$ if $y = 21\sqrt{2x+1}$

D. Determine the value of $f'(1)$ if $f(x) = \frac{-9}{x-2}$

E. Determine the value of $\left.\frac{dy}{dx}\right|_{x=8}$ if $y = 36x^{\frac{1}{3}}$

F. Given $y = \frac{2x-3}{3x+4} - 10x$, determine the value of $\frac{dy}{dx}$ when $x = -1$

G. Determine $\frac{ds}{dt}$, given that $s = 6t - 3$

H. Determine $h'(1.5)$ if $h(x) = x^2 + 2x - 3$

I. Given $s = \frac{1}{2t^2}$, determine $\frac{ds}{dt}$ when $t = -\frac{1}{2}$

J. Determine the value of the derivative $\frac{dy}{dx}$ at $x=-2$, given that $y=\frac{-6}{x+1}$

K. If $y=36\sqrt{x}$, determine the value of $\left.\frac{dy}{dx}\right|_{x=4}$

L. Determine the derivative of $y=|x|$ at $x=13$.

M. If s is measured in feet and t in seconds, determine the velocity at time t = 2 of the motion $s=t^2+3t$.

N. If $y=3\sqrt{1+2x}$, Determine the value of $\left.\frac{dy}{dx}\right|_{x=0}$

O. If $f(x)=\frac{-8}{\sqrt{2+x}}$, determine the value of $f'(-1)$.

P. Evaluate $f'(0)$ if $f(x)=e^{4x}$.

Q. Determine the x-coordinate of the vertex of the parabola $y=x^2-4x+1$ by making use of the fact that at the vertex the slope of the tangent is zero.

R. Given $y=\frac{-(1-5x)^6}{6}$, determine the value of $\frac{dy}{dx}$ when $x=0$.

S. Determine the slope of the tangents to the parabola $y=-x^2+5x-6$ at its points of intersection with the x-axis. Use only the positive slope in the SUDOKU.

T. Determine the value of $\left.\frac{d^3y}{dx^3}\right|_{x=0}$ if $y=\frac{1}{5}x^5+\frac{1}{6}x^3-2x^2+17x-9$

U. A point moves in the plane according to the law $x=t^2+2t$ and $y=\frac{8}{3}t^3-8t$.

Determine $\frac{dy}{dx}$ when $t=3$.

V. If $y=\ln(x+3)^2$, determine the value of $\frac{dy}{dx}$ when $x=-2$.

W. Given $f(x) = \frac{1}{18}(2x-1)^3(3x+4)^2$, determine $f'(0)$.

X. If $xy = -4$, determine the value of $\frac{dy}{dx}$ at the point $\left(-\sqrt{2},\, 2\sqrt{2}\right)$.

Y. Evaluate $\left.\frac{dy}{dx}\right|_{x=1}$ if $y = \frac{448}{5}\left(\frac{x}{1+x}\right)^5$.

Z. Determine the value of $g'(0)$ if $g(x) = \frac{3x-1}{3x+1}$

	A	B					C	D
		E		F				G
			H			I		
			J			K		
	L		M		N		O	
		P			Q			
		R			S			
T				U		V		
W	X					Y	Z	

Here is a blank SUDOKU board for you to use:

Solution to the Sudoku With Derivatives Puzzle

A = 8
B = 6
C = 7
D = 9

E = 3
F = 7
G = 6
H= 5

I = 8
J = 6
K = 9
L = 1

M = 7
N = 3
O = 4
P = 4

Q = 2
R = 5
S = 1
T = 1

U = 8
V = 2
W = 4
X = 2

Y = 7
Z = 6

2	8	6	3	1	4	5	7	9
5	4	3	8	7	9	1	2	6
9	7	1	5	2	6	8	3	4
3	5	7	6	4	8	9	1	2
8	1	2	7	9	3	6	4	5
6	9	4	1	5	2	3	8	7
7	3	5	2	6	1	4	9	8
1	6	9	4	8	7	2	5	3
4	2	8	9	3	5	7	6	1