Derivative Quiz

(Q1.) If $y=(\sin x)^x$, then $\frac{dy}{dx}=?$

(A) $(\cos x)^x$

(B) $x\sec x+\ln(\sin x)$

(C) $(\sin x)^x\left(x\cot x+\ln(\sin x)\right)$

(D) $(\sin x)^x\left(x\csc x+\ln(\sin x)\right)$

(E) $(\cos x)^x\left(-x\tan x+\ln(\tan x)\right)$

(F) $(\cos x)^x\left(x\tan x+\ln(\cos x)\right)$

(Q2.) $\frac{d}{dx}\left(e^{\tan^{-1}(x^2)}\right)=?$

(A) $\frac{2xe^{\tan^{-1}(x^2)}}{1+x^4}$

(B) $\frac{e^{\tan^{-1}(x^2)}}{1+x^4}$

(C) $e^{\frac{2x}{1+x^4}}$

(D) $\frac{2x}{1+x^4}$

(E) $\frac{2xe^{\tan^{-1}(x^2)}}{1+x^2}$

(Q3.) If $f(x)=\frac{x}{1+\ln x}$, then $f'(x)=?$

(A) $\frac{x}{(x+1)^2}$

(B) $\frac{\ln x}{x(1+\ln x)^2}$

(C) $\frac{1}{\ln x(1+\ln x)^2}$

(D) $\frac{-1}{x(1+\ln x)^2}$

(E) $\frac{\ln x}{(1+\ln x)^2}$

(Q4.) Determine $\frac{d^2y}{dx^2}$ for $9x^2 + y^2 = 9$

(A) $\frac{-9}{y^3}$

(B) $\frac{-18}{y^3}$

(C) $\frac{9x - y}{xy^3}$

(D) $\frac{9x + y}{y^3}$

(E) $\frac{-81}{y^3}$

(Q5.) Find the second derivative of $f(x) = e^{-x^2}$

(A) $f''(x) = (4x^2 - 2)e^{-x^2}$

(B) $f''(x) = (4x^2 - 1)e^{-x^2}$

(C) $f''(x) = (2x^2 - 4)e^{-x^2}$

(D) $f''(x) = 4x^2e^{-x^2}$

(E) $f''(x) = -2xe^{-x^2}$

(Q6.) If $\sqrt{x} + \sqrt{y} = 1$, then $\frac{dy}{dx} = ?$

(A) $\frac{-\sqrt{x}}{1+\sqrt{y}}$

(B) $\frac{\sqrt{y}}{\sqrt{x}}$

(C) $\frac{\sqrt{x}}{\sqrt{y}}$

(D) $\frac{-\sqrt{x}}{\sqrt{y}}$

(E) $\frac{-\sqrt{y}}{\sqrt{x}}$

(Q7.) Differentiate $f(x) = \cos x \tan x$

(A) $\cos x$

(B) $\sin x$

(C) $\sin x \sec^2 x$

(D) $\cos x \sec^2 x$

(E) $\sec x \tan x$

(Q8.) Find y' if $y = \sec(x^3)$

(A) $\sec\left(3x^2\right)$

(B) $\sec\left(x^3\right)\tan\left(x^3\right)$

(C) $3x^2 \sec\left(3x^2\right)\tan\left(3x^2\right)$

(D) $x^3 \sec\left(3x^2\right)\tan\left(3x^2\right)$

(E) $3x^2 \sec\left(x^3\right)\tan\left(x^3\right)$

(Q9.) $\dfrac{d}{dx}\left(\dfrac{\sqrt{x}}{1+x^2}\right)$,

(A) $\dfrac{1-3x^2}{2\sqrt{x}\left(1+x^2\right)^2}$

(B) $\dfrac{1-3x^2}{\sqrt{x}\left(1+x^2\right)^2}$

(C) $\dfrac{1-3x^2}{2\sqrt{x}\left(1+x^4\right)}$

(D) $\dfrac{1-2x^2}{2\sqrt{x}\left(1+x^4\right)}$

(E) $\dfrac{-2x^2}{2\sqrt{x}\left(1+x^2\right)^2}$

(Q10.) Differentiate $f(x) = \ln\left(\frac{x^2}{x^3+4}\right)$

(A) $\frac{-x^3}{\left(x^3+4\right)}$

(B) $\frac{-x^3+8}{x\left(x^3+4\right)}$

(C) $\frac{2x^3+7}{x\left(x^3+4\right)}$

(D) $\frac{1}{x^2\left(x^3+4\right)}$

(E) $\frac{x^3+4}{x^2}$