■ 1. Find the derivative of $y = \dfrac{4x}{(x^2-1)^3}$.

A $y' = -\dfrac{4x}{(x-1)^2}$

B $y' = -\dfrac{4x}{(x^2-1)^4}$

C $y' = -\dfrac{4(5x^2+1)}{(x^2-1)^4}$

D $y' = -\dfrac{8x}{(x-1)^2}$

■ 2. Given the function $g(x) = (2x + h(3x))^2$, which of the following represents $g'(x)$?

A $2(2x + h(3x)) \cdot 3h'(x)$

B $2(2 + 3h'(3x))$

C $2(2x + h(3x))(2 + 3h'(3x))$

D $2(2x + h(3x))(h'(x))$

■ 3. Evaluate $\dfrac{d}{dx}[\sin^4(2x)]$.

A $8\sin^3(2x)$

B $4\cos^3(2x)$

C $4\sin^3(2x)\cos(2x)$

D $8\sin^3(2x)\cos(2x)$

■ 4. Find the derivative of the exponential function $y = e^{\sqrt{x+1}}$.

A $y' = \dfrac{e^{\sqrt{x+1}}}{2\sqrt{x+1}}$

B $y' = \dfrac{e^{\sqrt{x}}}{2\sqrt{x+1}}$

C $y' = \dfrac{e^{\sqrt{x+1}}}{\sqrt{x+1}}$

D $y' = e^{\sqrt{x+1}}$

■ 5. Find the derivative of the logarithmic function $y = \ln(x^2 - 5x)$.

A $y' = \dfrac{2x + 5}{x^2 + 5x}$

B $y' = \dfrac{2x - 5}{x^2 - 5}$

C $y' = \dfrac{5 - 2x}{x^2 - 5x}$

D $y' = \dfrac{2x - 5}{x^2 - 5x}$

■ 6. Find the slope of the tangent line to the curve $x^2 + xy^2 + y = 25$ at the point $(2,3)$.

A -1

B 38

C -4

D 11

■ 7. Given that $5x + \cot y = 3$, find $\dfrac{dy}{dx}$.

A $5\cos^2 y$

B $5\sin^2 y$

C $5\csc y \cot y$

D $\dfrac{5}{1 + 25y^2}$

■ 8. Given that f and g are inverses of each other, find $g'(9)$ given $f(-3) = 9$, $f'(-3) = 4$, $f(9) = -3$, and $f'(9) = 6$.

A $\dfrac{1}{6}$

B $\dfrac{1}{9}$

C $\dfrac{1}{4}$

D $-\dfrac{1}{6}$

■ 9. Find the derivative of the inverse trig function $f(x) = \tan^{-1}(x^2 - 1)$.

A $f'(x) = \dfrac{2x}{x^4 - 2x^2 + 2}$

B $f'(x) = \dfrac{1}{x^4 - 2x^2 + 2}$

C $f'(x) = \dfrac{2x}{1 + 4x^2}$

D $f'(x) = \dfrac{1}{1 + 4x^2}$

■ 10. Find the derivative of the logarithmic function $y = \ln\sqrt[3]{2x^3 - 5}$.

A $y' = \dfrac{2x}{2x^3 - 5}$

B $y' = \dfrac{x^2}{2x^3 - 5}$

C $y' = \dfrac{2x^2}{2x^3 + 5}$

D $y' = \dfrac{2x^2}{2x^3 - 5}$

■ 11. Given $\ln y + x^2y^2 = 9$, determine an equation for $\dfrac{dy}{dx}$ in terms of x and y. Then find an equation for all lines tangent to the curve when $y = 1$.

■ 12. Given that $f(x) = e^x \sin x$,

a. Find average rate of change on the interval $\left[-\pi, \dfrac{\pi}{2}\right]$.

b. Determine the equation of the tangent line to the curve at $x = \pi$.

c. Determine all values on the interval $[0,2\pi]$ where the second derivative is 0.