



Calculus 1 Workbook

Other derivatives

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MATH

INVERSE TRIGONOMETRIC DERIVATIVES

- 1. Find $f'(t)$.

$$f(t) = 4 \sin^{-1} \left(\frac{t}{4} \right)$$

- 2. Find $g'(t)$.

$$g(t) = -6 \cos^{-1}(2t + 3)$$

- 3. Find $h'(t)$.

$$h(t) = 2 \sec^{-1}(6t^2 + 3) - 8 \cot^{-1} \left(\frac{t^3}{3} \right)$$

- 4. Find the derivative.

$$y = (x^4 + x^2) \csc^{-1} x + \sin(5x^3)$$

- 5. Find the derivative.



$$y = \frac{\sin^{-1}\left(x + \frac{x^2}{2}\right)}{1 + x}$$

■ 6. Find the derivative.

$$y = \frac{1 - \sin^{-1}(2x)}{1 + \cos^{-1}(2x)}$$



HYPERBOLIC DERIVATIVES

■ 1. Find $f'(\theta)$ if $f(\theta) = 3 \sinh(2\theta^2 - 5\theta + 2)$.

■ 2. Find $g'(\theta)$ if $g(\theta) = 2 \cosh(5\theta^{\frac{3}{2}} + 6\theta)$.

■ 3. Find $h'(\theta)$ if $h(\theta) = 9 \tanh(3\theta^2 - \theta\sqrt{3})$.

■ 4. Find the derivative of the hyperbolic function.

$$y = \coth(x^2 + 3x) - x^4 \operatorname{csch}(x^2)$$

■ 5. Find the derivative of the hyperbolic function.

$$y = \frac{2x + 3e^x}{\cosh(x^{-5})}$$

■ 6. Find the derivative of the hyperbolic function.

$$y = \tanh(x^2) \tan(x^2)$$



INVERSE HYPERBOLIC DERIVATIVES

■ 1. Find $f'(t)$ if $f(t) = 7 \sinh^{-1}(5t^4)$.

■ 2. Find $g'(t)$ if $g(t) = 4 \cosh^{-1}(2t - 3)$.

■ 3. Find $h'(t)$ if $h(t) = 9 \tanh^{-1}(-7t + 2)$.

■ 4. Find the derivative of the inverse hyperbolic function.

$$y = \cosh^{-1}(3x^3 + 4x^2) - x^2 \sinh^{-1}(e^x)$$

■ 5. Find the derivative of the inverse hyperbolic function.

$$y = \left(\operatorname{csch}^{-1} \left(\frac{x^2}{3x^4 + 1} \right) \right)^5$$

■ 6. Find the derivative of the inverse hyperbolic function.

$$y = -\frac{\coth^{-1} x}{\tanh^{-1}(2x^4)}$$



LOGARITHMIC DIFFERENTIATION

- 1. Use logarithmic differentiation to find dy/dx .

$$y = (\ln x)^{\ln(x^2)}$$

- 2. Use logarithmic differentiation to find dy/dx .

$$y = 5x^4 e^{3x} \sqrt[4]{x}$$

- 3. Use logarithmic differentiation to find dy/dx .

$$y = (7 - 4x^3)^{x^2+9} \sqrt[3]{1 - \cos(3x)}$$

- 4. Use logarithmic differentiation to find dy/dx .

$$y = \frac{(2e)^{\cos x}}{(3e)^{\sin x}}$$

- 5. Use logarithmic differentiation to find dy/dx .

$$y = e^x (2e)^{\sin x} (3e)^{\cos x}$$



■ 6. Use logarithmic differentiation to find dy/dx .

$$y = \frac{(1 - 2x)^{\sin x}}{(x^3 - 2x)^{5x+7}}$$



