$\frac{d}{dx} f(x) = f'(x)$ $f(x)$

$[g(x)]^2 = g^2(x)$

~~$f(x)'$~~ $g(x)^2 = g(x^2)$

$\frac{d}{dx}[\csc x] = -\csc x \cot x$

$= -\csc\cot x$

$$\frac{d}{dx}\left[\sqrt[3]{x}\sin x\right] = \frac{d}{dx}\left[(x^{1/3})(\sin x)\right]$$

$$= \left(\frac{1}{3}x^{-2/3}\right)(\sin x) + (x^{1/3})(\cos x)$$

Let $h(x) = \frac{\csc(3x)}{x^3}$.

Find $h'(x)$.

Choose 1 answer:

(A) $\frac{-\csc(3x)\cot(3x)}{3x^2}$

(B) $\frac{-\csc(3x)\cot(3x)}{x^2}$

(C) $\frac{-\csc(3x)\left(x\cot(3x)+3\right)}{x^6}$

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

$$h'(x) = \frac{x^3\cdot(-\csc 3x\cot 3x)\cdot 3 - (\csc 3x)(3x^2)}{(x^3)^2}$$

$$= \frac{-3x^2\csc 3x\,(x\cot 3x + 1)}{x^6}$$

$$= \frac{-3\csc 3x\,(x\cot 3x + 1)}{x^4}$$

$y = -3\tan^3(\sin(x))$ $= -3[\tan(\sin x)]^3$

Find $\frac{dy}{dx}$.

$y' = -9[\tan(\sin x)]^2 \cdot \sec^2(\sin x) \cdot \cos x$

Choose 1 answer:

(A) $-9\sin^2(x)\cos(x)\sec^2(\sin^3(x))$

(B) $-9\tan^2(x)\sec^2(\sin(x))\cos(x)$

(C) $-9\sec^2(x)\sin^2(\tan(x))\cos(\tan(x))$

(D) $-9\tan^2(\sin(x))\sec^2(\sin(x))\cos(x)$

Let $h(x) = x\cos^3(x)$. $= [(x)(\cos x)^3]$

Find $h'(x)$.

$h'(x) = 1\cdot\cos^3 x + x\cdot 3\cos^2 x\cdot(-\sin x)$

$= \cos^2 x(\cos x - 3x\sin x)$

Choose 1 answer:

(A) $-3\cos^2(x)\sin(x)$

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

(C) $\cos^3(x) - x\sin^3(x)$

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

Let $f(x) = \log_3(x - 4x^2)$.

Find $f'(x)$.

Choose 1 answer:

(A) $\frac{1 - 8x}{(x - 4x^2)\ln(3)}$

(B) $\frac{1 - 8x}{(x - 4x^2)\log_3(x)}$

(C) $\frac{1 - 8x}{x - 4x^2}$

(D) $\frac{1}{(x - 4x^2)\ln(3)}$

$$f'(x) = \frac{1}{(x-4x^2)\ln 3} \cdot (1-8x)$$

$$= \frac{1-8x}{(x-4x^2)\ln 3}$$

Let $g(x) = 3^{(5x-2)}$.

Find $g'(x)$.

Choose 1 answer:

(A) $5\ln(3) \cdot 3^{(5x-2)}$

(B) $\ln(3) \cdot 3^{(5x-2)}$

(C) $5 \cdot 3^{(5x-2)}$

(D) $(5x - 2) \cdot 3^{(5x-3)}$

$$g'(x) = 3^{5x-2} \ln 3 \cdot 5$$

$$= 15 \ln 3^{5x-2}$$

If $f(x) = \sin\left(e^{-x}\right)$, then $f'(x) =$

$\cos(e^{-x}) \cdot e^{-x} \cdot (-1)$

(A) $-\cos(e^{-x})$

(B) $\cos(e^{-x}) + e^{-x}$

(C) $\cos(e^{-x}) - e^{-x}$

(D) $e^{-x}\cos(e^{-x})$

(E) $-e^{-x}\cos(e^{-x})$

For a function g, we are given that $g(7) = -3$ and $g'(7) = -1$.

What's the equation of the tangent line to the graph of g at $x = 7$?.

Choose 1 answer:

(A) $y - 7 = -1(x + 3)$

(B) $y - 7 = -3(x + 1)$

(C) $y + 1 = -3(x - 7)$

(D) $y + 3 = -1(x - 7)$

$y - y_1 = m(x - x_1)$

$y - (-3) = -1(x - 7)$

What is the instantaneous rate of change at $x = 2$ of the function f given by $f(x) = \frac{x^2 - 2}{x - 1}$?

(A) -2 (B) $\frac{1}{6}$ (C) $\frac{1}{2}$ (D) 2 (E) 6

$$f'(x) = \frac{(x-1)(2x) - (x^2-2)(1)}{(x-1)^2}$$

$$f'(2) = \frac{1 \cdot 4 - (4-2)}{1} = \frac{4-2}{1} = 2$$

The following table lists the values of functions g and h, and of their derivatives, g' and h', for the x-values -2 and 3.

x	$g(x)$	$h(x)$	$g'(x)$	$h'(x)$
-2	0	3	1	-5
3	5	3	1	5

Evaluate $\frac{d}{dx}\left[g\left(h(x)\right)\right]$ at $x = -2$.

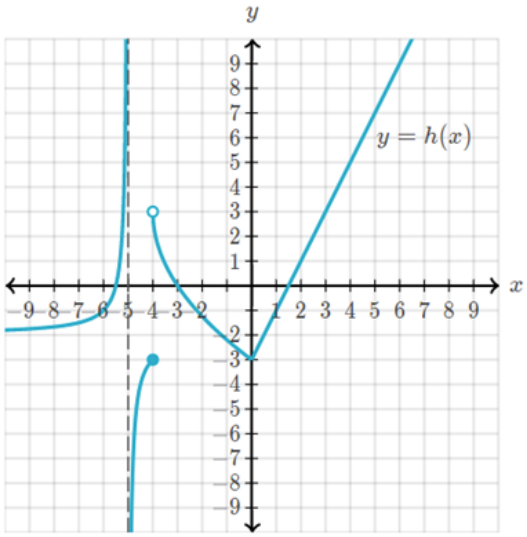
$= -5$

$$\frac{d}{dx}[g(h(x))] = g'(h(x)) \cdot h'(x)$$

$$= g'(h(-2)) \cdot h'(-2)$$

$$= g'(3) \cdot (-5) = 1 \cdot (-5)$$

The graph of function h is given below. It has a vertical asymptote at $x = -5$ and a horizontal asymptote at $y = -2$.



Select all the x-values for which h is not differentiable.

Choose all answers that apply:

- (A) -5
- (B) -4
- (C) -2
- (D) 0