

3.6
 18) $y = 4\sqrt{\sec x + \tan x}$
 $y = 4(\sec x + \tan x)^{1/2}$
 $y' = 4 \cdot \frac{1}{2}(\sec x + \tan x)^{-1/2} \cdot (\sec x + \tan x + \sec^2 x)$

3.9 (29) $y = 3^x + 1$
 $y = 5x - 1 \quad m = 5$
 $y' = 3^x \cdot \ln 3 = 5$

$f = 4$
 $f' = 0$
 $g = (\sec x + \tan x)^{1/2}$
 $g' = \frac{1}{2}(\sec x + \tan x)^{-1/2} \cdot (\sec x + \tan x + \sec^2 x)$

Oct 22-10:09 AM

1) True or False. If f has a derivative at $x = a$, then f is continuous at $x = a$. Justify your answer.

2) True or False. If f is continuous at $x = a$, then f has a derivative at $x = a$. Justify your answer. \checkmark

3) Which of the following is true about the graph of $f(x) = x^{4/5}$ at $x = 0$?

a) it has a corner b) it has a cusp c) it has a vertical tangent
 d) it has a discontinuity e) $f(0)$ does not exist

Oct 19-9:42 AM

Find the derivatives of these functions with respect to x .

1) $f(x) = \pi$

2) $f(x) = \pi^2$

3) $f(x) = \pi^{15}$

4) $f(x) = \frac{x}{\pi} = \frac{1}{\pi} \cdot x \quad f'(x) = \frac{1}{\pi}$

5) $f(x) = \frac{\pi}{x} = \pi \cdot x^{-1} \quad f'(x) = \pi \cdot (-1) \cdot x^{-2} = -\frac{\pi}{x^2}$

Oct 19-9:49 AM

3-9 day 2 Derivates Logarithmic Funcons

Learning Objectives:

I can calculate the derivates of logarithmic funcons.

Oct 1-7:53 AM

Derivates of Logarithmic Funcons

$\frac{d}{dx}(\ln x) = \frac{1}{x}$ $\ln(2x) \quad \frac{1}{2x} \cdot 2 = \frac{1}{x}$

$\frac{d}{dx}(\log_b x) = \frac{1}{x \cdot \ln b}, x > 0$

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Ex1. Differentiate

1.) $y = x^3 \ln x$
 $f = x^3 \quad g = \ln x$
 $f' = 3x^2 \quad g' = \frac{1}{x}$
 $x^3 \cdot \frac{1}{x} + 3x^2 \ln x = x^2 + 3x^2 \ln x$

3.) $y = \ln x \cdot \sin x$
 $y' = \frac{1}{x} \cdot \sin x + \ln x \cdot \cos x$

2.) $y = \frac{\ln x}{e^x}$
 $\frac{\ln x}{e^x} = \frac{1}{x} \cdot \frac{e^x}{e^x} = \frac{e^x - \ln x e^x}{(e^x)^2}$

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4.) $y = \ln(\cos x)$
 $y' = \frac{1}{\cos x} \cdot -\sin x$
 $= -\frac{\sin x}{\cos x} = -\tan x$

5.) $y = (\ln x)^3$
 $\frac{3(\ln x)^2}{x}$

6.) $y = \ln\left(\frac{5}{x}\right)$
 $\frac{1}{\frac{5}{x}} \cdot \frac{-5}{x^2}$
 $\frac{x}{5} \cdot \frac{-5}{x^2}$
 $= -\frac{1}{x}$

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7.) $g(x) = \ln(x^2 e^x - x^2)$
 $\frac{x^2 e^x + 2x e^x - 2x}{x^2 e^x - x^2}$
 $\frac{x e^x + 2e^x - 2}{x e^x - x}$

8.) $g(x) = \log(4x)$ $\frac{1}{4x \cdot \ln 10} \cdot 4$
 \log_b^t $\frac{1}{x \cdot \ln b}$

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9.) $h(x) = \sqrt{e^x} \cdot \ln(x^5)$

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Opener

Non-Calculator

If $y = x^2 e^x$, then $\frac{dy}{dx} =$

(A) $2xe^x$ (B) $x(x+2e^x)$ (C) $xe^x(x+2)$
 (D) $2x + e^x$ (E) $2x + e$

$f = x^2$ $g = e^x$
 $f' = 2x$ $g' = e^x$

$f'(x) = 2e^{4x} \cdot 4x^3 = 8x^3 e^{4x}$

Calculator

Let f be the function given by $f(x) = 2e^{4x^2}$. For what value of x is the slope of the line tangent to the graph of f at $(x, f(x))$ equal to 3?

(A) 0.168 (B) 0.276 (C) 0.318 (D) 0.342 (E) 0.551

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Homework

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