Derivative Practice

1) $(x^2+1)^5$

$5(x^2+1)^4(2x)$

2) $(x^3-3x)^4$

$4(x^3-3x)^3(3x^2-3)$

3) $(x-1)^3(x+2)^4$

$f \cdot g + f \cdot g'$

$3(x-1)^2 \cdot 1\,(x+2)^4 + (x-1)^3 \cdot 4\,(x+2)^3 \cdot 1$

4) $\frac{5}{(2x-3)^4} = 5(2x-3)^{-4}$

$5 \cdot -4(2x-3)^{-5} \cdot 2$

$0(2x-3)^4 - 5 \cdot 4(2x-3)^3 \cdot 2$

Oct 24-8:28 AM

Opener

7. $\frac{d}{dx}\cos^2(x^3) =$ $\frac{d}{dx}[\cos(x^3)]^2$

(A) $6x^2\sin(x^3)\cos(x^3)$

(B) $6x^2\cos(x^3)$ $2\cos(x^3)\cdot(-\sin(x^3))\cdot 3x^2$

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

(D) $-6x^2\sin(x^3)\cos(x^3)$

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

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1) True or False. If f(x) = x² + x, then f'(x) exists for every real number x. Justify your answer.

2) True or False. If the left-hand derivative and the right-hand derivative of f exist at x = a, then f'(a) exists. Justify your answer.

3) Let f(x) = 4-3x. Which of the following is equal to f'(-1)?

a) -7 b) 7 c) -3 d) 3 e) does not exist

4) Let f(x) = 1-3x². Which of the following is equal to f'(1)?

a) -6 b) -5 c) 5 d) 6 e) does not exist

For #5 and #6, let f(x) = x² - 1 when x < 0 and let f(x) = 2x-1 when x ≥ 0.

5) Which of the following is equal to the left-hand derivative of f at x = 0?

a) -2 b) 0 c) 2 d) ∞ e) -∞

6) Which of the following is equal to the right-hand derivative of f at x = 0?

a) -2 b) 0 c) 2 d) ∞ e) -∞

Oct 19-9:31 AM

Oct 21-10:53 AM

3-9 day 1 Derivaves of Exponenal Funcons

Learning Objecves:

I can calculate the derivaves of exponenal funcons.

Oct 1-7:39 AM

Derivaves of Exponenal Funcons

$\frac{d}{dx}(e^x) = e^x$ e^{2x} $e^{2x}\cdot 2$ e^{x^2} $e^{x^2}\cdot 2x$ (f, f')

$\frac{d}{dx}(b^x) = b^x \cdot \ln b$ 5^x $5^x \cdot \ln 5$ 2^x $2^x \cdot \ln 2$

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Ex1. Differenate

1.) $y = x^2 e^x$

$f(x) = x^2$, $f'(x) = 2x$; $g(x) = e^x$, $g'(x) = e^x$

$y' = x^2 e^x + 2x e^x$

2.) $y = \dfrac{\sin x}{e^x}$

$\dfrac{f' \cdot g - f \cdot g'}{g^2}$

$\dfrac{\cos x \cdot e^x - \sin x \cdot e^x}{(e^x)^2}$

3.) $y = \cos(e^x)$

$y' = -\sin(e^x) \cdot e^x$

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4.) $g(x) = e^{2x+1}$

$g'(x) = e^{2x+1} \cdot 2$

5.) $g(x) = e^{x^2+2x+5}$

$g'(x) = e^{x^2+2x+5} \cdot (2x+2)$

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6.) $y = \sqrt{x^3 e^{x^2}}$

$y' = \frac{1}{2}(x^3 e^{x^2})^{-1/2}(3x^2 e^{x^2} + 2x^4 e^{x^2})$

$x^3 \cdot e^{x^2} \cdot 2x$

7.) $y = \dfrac{e^{3x+5}}{\sqrt{2x-3}}$

$y' = \dfrac{(3e^{3x+5})(\sqrt{2x-3}) - (e^{3x+5})(\frac{1}{2}(2x-3)^{-1/2} \cdot 2)}{2x-3}$

8.) $h(x) = e^{x^3}\cos(x^2 + x)$

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Homework

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