Questions on 4.4 HW?

(45) $y = \sqrt[5]{\dfrac{(x-3)^4(x^2+1)}{(2x+5)^3}} = \left(\dfrac{(x-3)^4(x^2+1)}{(2x+5)^3}\right)^{1/5}$

$\ln y = \ln\left(\dfrac{(x-3)^4(x^2+1)}{(2x+5)^3}\right)^{1/5}$

$\dfrac{1}{5}\ln\left(\dfrac{(x-3)^4(x^2+1)}{(2x+5)^3}\right) = \ln y$

$\dfrac{1}{5}\left[\ln(x-3)^4 + \ln(x^2+1) - \ln(2x+5)^3\right] = \ln y$

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

$\dfrac{d}{dx}$

$\dfrac{4}{5}\cdot\dfrac{1}{x-3}\cdot 1 + \dfrac{1}{5}\cdot\dfrac{1}{(x^2+1)}\cdot 2x - \dfrac{3}{5}\cdot\dfrac{1}{2x+5}\cdot 2 = \dfrac{1}{y}\cdot y'$

$y\left(\dfrac{4}{5(x-3)} + \dfrac{2x}{5(x^2+1)} - \dfrac{6}{5(2x+5)}\right) = y\cdot\dfrac{1}{y}\cdot y'$

$y\left(\dfrac{4}{5(x-3)} + \dfrac{2x}{5(x^2+1)} - \dfrac{6}{5(2x+5)}\right) = y'$

$\left(\dfrac{(x-3)^4(x^2+1)}{(2x+5)^3}\right)\left(\dfrac{4}{5(x-3)} + \dfrac{2x}{5(x^2+1)} - \dfrac{6}{5(2x+5)}\right) = y'$

(48) $\ln y = \ln x$ $(1/\ln x)$

$\ln y = \dfrac{1}{\ln x}\cdot\dfrac{\ln x}{1}$

$\ln y = 1$

$y\cdot\dfrac{1}{y}\cdot y' = 0\cdot y$

$y' = 0 \quad , x > 0$

AP CALCULUS AB
Unit 4 Review
Derivatives

No calculator may be used to solve the following problems.

1. If $x^3 + 2x^2y - 4y = 7$, then when $x = 1$, $\frac{dy}{dx} =$

(A) $-\frac{9}{2}$ (B) 0 (C) -8 (D) -3 (E) $\frac{7}{2}$

2. If $f(x) = x\sqrt{4x-1}$, then $f'(x)$ is

(A) $\frac{6x-1}{\sqrt{4x-1}}$ (B) $\frac{2x}{\sqrt{4x-1}}$ (C) $\frac{1}{\sqrt{4x-1}}$ (D) $\frac{-6x+2}{\sqrt{4x-1}}$ (E) $\frac{9x-2}{2\sqrt{4x-1}}$

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

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

(B) $6x^2\cos(x^3)$

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

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

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

4. An equation of the line tangent to the graph of $y=\cos(2x)$ at $x=\frac{\pi}{4}$ is

(A) $y-1=-\left(x-\frac{\pi}{4}\right)$

(B) $y-1=-2\left(x-\frac{\pi}{4}\right)$

(C) $y=2\left(x-\frac{\pi}{4}\right)$

(D) $y=-\left(x-\frac{\pi}{4}\right)$

(E) $y=-2\left(x-\frac{\pi}{4}\right)$

5. If $f(x)=\cos e^{2x}$, then $f'(x)=$

(A) $\sin e^{2x}$ (B) $2\sin e^{2x}$ (C) $-\sin e^{2x}$ (D) $-2\sin e^{2x}$ (E) $-2e^{2x}\sin e^{2x}$

6. If $f(x)=\tan(3x)$, then $f'\left(\frac{\pi}{9}\right)=$

(A) $\frac{4}{3}$ (B) 4 (C) 6 (D) 12 (E) $6\sqrt{3}$

7. If $x^2 = 25 - y^2$, what is the value of $\frac{d^2y}{dx^2}$ at the point $(3, 4)$?

(A) $-\frac{25}{64}$ (B) $-\frac{7}{64}$ (C) $\frac{7}{64}$ (D) $\frac{25}{64}$ (E) $\frac{4}{3}$

A graphing calculator may be used to solve the following problems.

8. Let f be a differentiable function such that $f(5) = 3$ and $f'(5) = 2$. If the tangent line to the graph of f at $x = 5$ is used to find an approximation to a zero of f, that approximation is

(A) 6.5 (B) 4.3 (C) 3.5 (D) 0.5 (E) 0.3

9. Let f be the function given by $f(x) = 5e^{3x^3}$. For what positive value of a is the slope of the line tangent to the graph of f at $(a, f(a))$ equal to 6?

(A) 0.142 (B) 0.344 (C) 0.393 (D) 0.595 (E) 0.714

10. Let $f(x)=\sqrt{2x}$. If the rate of change of f at $x=c$ is four times its rate of change at $x=1$, then $c=$

(A) $\frac{1}{16}$ (B) $\frac{1}{2\sqrt{2}}$ (C) $\frac{1}{\sqrt{2}}$ (D) 1 (E) 32

FREE RESPONSE. No calculator - show all of your work.

11. Consider the curve given by $x^2+3y^2=1+3xy$.

(a) Show that $\frac{dy}{dx}=\frac{3y-2x}{6y-3x}$

(b) Find all points on the curve whose x-coordinate is 1, and write an equation for the tangent line at each of these points.

Homework

Unit 4 Review

Oct 21-8:47 AM