Erickson
AP Calculus AB

Key

REVIEW FOR QUIZ #3.2

TOPICS:

- DERIVATIVES (POWER, PRODUCT, QUOTIENT, CHAIN, TRIG, E, LN)
- FINDING DERIVATIVES FROM A TABLE (APPLYING THE RULES)
- L'HOPITAL'S RULE

1. Given

$f(3)=0$	$f'(3)=6$
$g(3)=1$	$g'(3)=\frac{1}{3}$

.

a. Find $h'(3)$ if $h(x) = 4f(x)$

$h'(x) = 4 \cdot f'(x)$

$h'(3) = 4 \cdot f'(3) = 4(6) = \boxed{24}$

b. Find $h'(3)$ if $h(x) = g(x) + f(x)$

$h'(x) = g'(x) + f'(x)$

$h'(3) = g'(3) + f'(3) = \frac{1}{3} + 6 = \boxed{\frac{19}{3}}$

c. Find $h'(3)$ if $h(x) = f(x) \cdot g(x)$

$h'(x) = f(x) \cdot g'(x) + g(x) \cdot f'(x)$

$h'(3) = f(3) \cdot g'(3) + g(3) \cdot f'(3)$

$= 0\left(\frac{1}{3}\right) + 1(6) = \boxed{6}$

2. Find the derivative of each function:

a. $f(x) = e^{3x+2} - 3x$

$f'(x) = e^{3x+2}(3) - 3$

$\boxed{f'(x) = 3e^{3x+2} - 3}$

b. $f(x) = \dfrac{x^2+4}{x^2-4}$

$f'(x) = \dfrac{(x^2-4)(2x) - (x^2+4)(2x)}{(x^2-4)^2} = \dfrac{2x^3 - 8x - 2x^3 - 8x}{(x^2-4)^2}$

$\boxed{f'(x) = \dfrac{-16x}{(x^2-4)^2}}$

c. $y = \sin^2 x + \cos^2 x$, $y' =$

$y' = 2\sin x(\cos x) + 2\cos x(-\sin x)$

A. $2\sin x - 2\cos x$ **B.** $2\sin x\cos x$ **C.** $4\sin x\cos x$ **D.** 0

$2\sin x\cos x - 2\sin x\cos x = 0$

d. $y = x\sin x$, $y' =$ $x(\cos x) + \sin x$

A. $x\cos x$ **B.** $x\cos x + 1$ **C.** $\cos x$ **D.** $x\cos x + \sin x$

e. $y = xe^{3x-2}$

$y' = x \cdot e^{3x-2}(3) + e^{3x-2}$

$y' = 3xe^{3x-2} + e^{3x-2} = e^{3x-2}(3x+1)$

f. $y = \sin(x^2-1)$

$y' = \cos(x^2-1)(2x)$

$y' = 2x\cos(x^2-1)$

3. Evaluate $\lim_{x\to -1} \frac{2x^2-2}{x+1}$ $= \frac{2-2}{0} = \frac{0}{0}$

$\lim_{x\to -1} \frac{4x}{1} = \boxed{-4}$

4. Evaluate $\lim_{t\to 0} \frac{\sin 3t}{5t}$ $= \frac{0}{0}$

$\lim_{t\to 0} \frac{\cos(3t)(3)}{5} = \boxed{\frac{3}{5}}$