

Who's there? Key _____ Period: _____

AP Calculus AB: 3.5 Second Derivative & Derivatives with Tables

Find $\frac{dy}{dx}$ of each of the following functions

1) $y = (3x^2 + x)(5 - x)$

$$y' = 28x - 9x^2 + 5$$

2) $y = 2(x - 5)^2$

$$y' = 4x - 20$$

3) If $f(x) = \frac{6x^4}{5}$ then find $f''(x)$ and $f''(1)$

$$f''(x) = \frac{72x^2}{5}$$

$$f''(1) = \frac{72}{5}$$

4) Find the second derivative of the function $g(x) = \frac{3}{\sqrt[3]{x^5}} = 3x^{-5/3}$

$$g'(x) = \frac{-15x^{-8/3}}{3}$$

$$g''(x) = \frac{40}{3\sqrt[3]{x^{11}}}$$

5) Find $\frac{d^2y}{dx^2}$ for the function $y = 3x^4 + \frac{4x^2}{3} - \frac{2}{x^3} + 3\sqrt{x}$

$$y'' = 36x^2 + \frac{8}{3} - \frac{24}{x^5} - \frac{3}{4\sqrt{x^3}}$$

Who's there? _____

Period: _____

6) Evaluate $\lim_{h \rightarrow 0} \frac{4(x+h)^3 - (x+h) + 7 - (4x^3 - x + 7)}{h}$

$12x^2 - 1$

7) Using the table below find $f'(5)$ of each of the following functions of $f(x)$.

$g(5)$	$g'(5)$	$h(5)$	$h'(5)$	$n(5)$	$n'(5)$
2	-4	10	-12	$g(5)$	$h(5)$

a) $f(x) = \frac{1}{2}g(x)$

$f'(5) = -2$

b) $f(x) = 9$

$f'(5) = 0$

c) $f(x) = 5g(x) + 4$ *derivative of a constant is zero*
 $f'(x) = 5g'(x)$
 $f'(5) = -20$

d) $f(x) = 81 - 4h(x)$
 $f'(x) = -4h'(x)$
 $f'(5) = 48$

e) $f(x) = 7g(x) - 3h(x)$

$f'(5) = 8$

f) $f(x) = 3n(x) + 4$

$f'(5) = 30$

g) $f(x) = 4h(x) + 3 - 7n(x) + 12$

$f'(5) = -118$

Find $f(5)$ for the function below. And explain if this is the correct answer or if it could be something else.

h) $f'(x) = \frac{1}{2}g'(x) - n'(x)$

$f(x) = \frac{1}{2}g(x) - n(x)$

this may be the correct $f(x)$ but we don't know if it had a constant, like this