

Calculate your name here: Key

AP Physics C: 0.6 Calculator Use

Calculate the derivative of each of the functions below.

1.  $f(x) = 5x^4 + 6\sqrt{x} + 3$

$$f'(x) = 20x^3 + \frac{3}{\sqrt{x}}$$

2.  $g(x) = \frac{7}{2x^3} + \frac{4}{\sqrt[3]{x}} - 8$

$$g'(x) = \frac{-4}{3\sqrt[3]{x^4}} - \frac{2}{x^4}$$

3.  $h(t) = 7t^3 + 5\sin(3t)$

$$h'(t) = 15\cos(3t) + 21t^2$$

4.  $m(x) = (5x - 3)^2 + \ln(x^2)$

$$m'(x) = \frac{2(25x^2 - 15x + 1)}{x}$$

5.  $b(x) = \csc(3x^2)$

$$b'(x) = \frac{-6x \cos(3x^2)}{\sin^2(3x^2)}$$

6.  $n(x) = \frac{3x^2 - 4}{x + 1}$

$$n'(x) = \frac{3x^2 + 6x + 4}{(x + 1)^2}$$

7.  $y(t) = \arcsin(4t)$

$$y'(t) = \frac{4}{\sqrt{1 - 16t^2}}$$

8.  $r(x) = 3x^2(x^2 - 5)^3$

$$r'(x) = 6x(x^2 - 5)^2(4x^2 - 5)$$

9.  $w(x) = \sin^3(5x)$

$$w'(x) = 15 \sin^2(5x) \cos(5x)$$

10.  $v(t) = \frac{e^{4t}}{(2t + 5)^2}$

$$v'(t) = \frac{8(t + 2)e^{4t}}{(2t + 5)^3}$$

11. Using the equations above, calculate the slope of  $n(x)$  at  $x = 2$

$$n'(2) = 15 \cos(6) + 84 = \boxed{98.403}$$

*you can write either one of those answers*

12. Using the equations above, calculate the slope of  $m(x)$  at  $x = 0.1$

$$m'(0.1) = -5$$

13. Using the equations above, calculate when  $y(t)$  has a slope of 10



$$y'(t) = 10$$

$$t = \frac{-\sqrt{21}}{20} \text{ or } t = \frac{\sqrt{21}}{20}$$

14. Using the equations above, calculate when  $v(x)$  has a slope of 5.

$$v'(t) = 5$$

$$t = -2.516 \text{ or } t = 1.077$$