AP Calc WS#8 Derivative Function Name: \_\_\_\_\_\_

1. Find derivative by definition

|  |  |
| --- | --- |
|  | Find derivative of f(x) = x3, then f ' (3) |

Given , find the derivative f ' (4) find derivative f ' (2)

Find derivative by formula

* **If f(x) = xn then f (x) = f '(x) = nxn-1 NEVER**
* **If f(x) = g(x) ± h(x) then f (x) = f '(x) = g '(x) ± h '(x) FORGET**
* **If f(x) = kg(x) then f (x) = f '(x) = k g'(x) THESE**
* **If f(x) = C (a constant number) then f (x) = f '(x) = 0 FORMULA**

Find the following derivative

|  |  |  |
| --- | --- | --- |
| x5 | 5x7 – 11x3 + 12x – 47 | 4.773 |
|  |  | x4/3 |
| x-3 + 2 |  | x1/2 |
|  |  | (3x - 4)2 |
| t4 – 6y2 | 3x5 - 2t + 7 | 3x5 - 2t + 7 |

Recall: Instantaneous rate of change = **slope of tangent line m**

= **f ' (a) derivative of the function f at the point a** (= )

Tell whether f(x) is increasing or decreasing at x = c. and how fast is the change?

Hint: The slope f '(c) is positive or negative?

f(x) = x ½ + 2x – 13, c = 4 f(x) = x -2 – 3x + 11, c = 1

f(x) = x1.5 – 6x + 30, c = 9 f(x) = , c = 2

Given f '(x) = 3x2 – 10x + 5, find the “original” function f(x). Hint: Reverse problem

Find the intersection between the function and its derivative and write it in (x, y) format.

REMEMBER IN CALCULUS, ALWAYS WRITE WITH 3 DECIMAL PLACE

a. f(x) = b. g(x) =

Find the point on the graph f(t) = t3 – 2t + 4 where the tangent line is horizontal

Does the curve y = x4 – 2x2 + 2 have any horizontal tangents? If so, where?

How about the curve 0.2x4 – 9.7x3 – 2x2 + 5 + 4?

Compute the derivative using limit definition

a. f(x) = x2 f(x) = x-2

|  |  |
| --- | --- |
|  | *Differentiability*  *(How f '(a) might fail to exist)*  ***Theorem: If f has a derivative***  ***at x = a, then f is continuous***  ***at x = a***  *The converse of this Theorem is not always true yet.*  *How does a function does not have derivative?*  *Obviously, if function does not have a limit at the point, then it won't have slope (or derivative).*  *How about continuous? Do research about it and write it here.* |

Relationships between the Graphs of f and f '

The graph of f(x) is given below, sketch the graph of f '(x)

Algebraically

f(x) = ax3 + bx2 + cx + d. Find f(x) and f ’(x)

