

Section 3-1

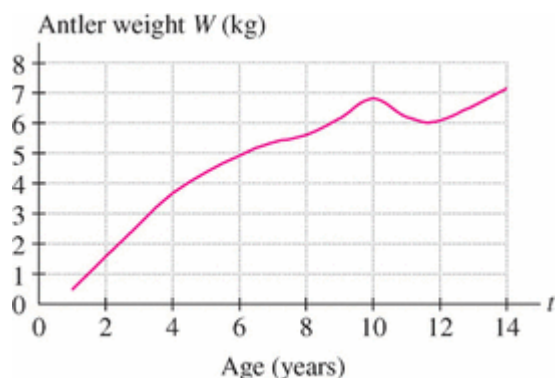
1. Estimating Slopes
2. Average rate of change, Instantaneous rate of change, and graphical representations.

Sections 3-2

1. Find a derivative using the formula $f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$.
2. Find a derivative using the formula $f'(x) = \lim_{x \rightarrow x_0} \frac{f(x) - f(x_0)}{x - x_0}$.
3. Sketching the graph of the derivative

Sample Problems

1. The graph displays data collected by the biologist Julian Huxley (1887–1975) on the average antler weight W of male red deer as a function of age t .

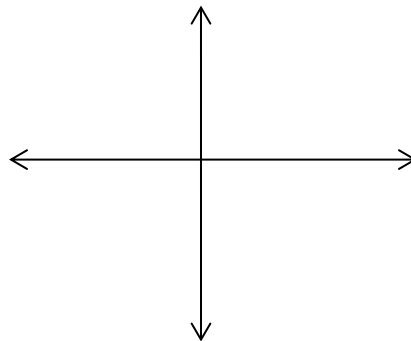
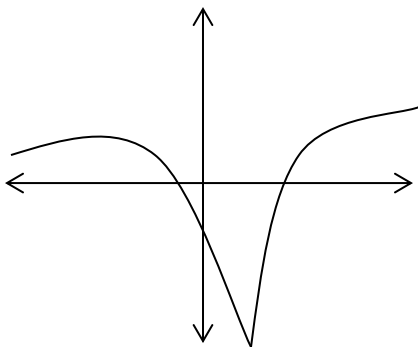


- a. Estimate the derivative at $t = 4$ and include units. (2)

- b. What does this number mean in Calculus terms? (2)

- c. What does this number mean specifically in terms of this problem?

2. Graph the derivative function.



3. Find a formula for the instantaneous rate of change of $f(x) = \sqrt{x+2}$ using the limit formula.
 - a. What geometric figure represents the instantaneous rate of change?
4. Find the average rate of change of $f(x) = \sqrt{x+2}$ with respect to x over the interval $[7,23]$.
 - a. What geometric figure represents the average rate of change?

5. Use the definition of a derivative to calculate: Know how to use both formulas for the limit process

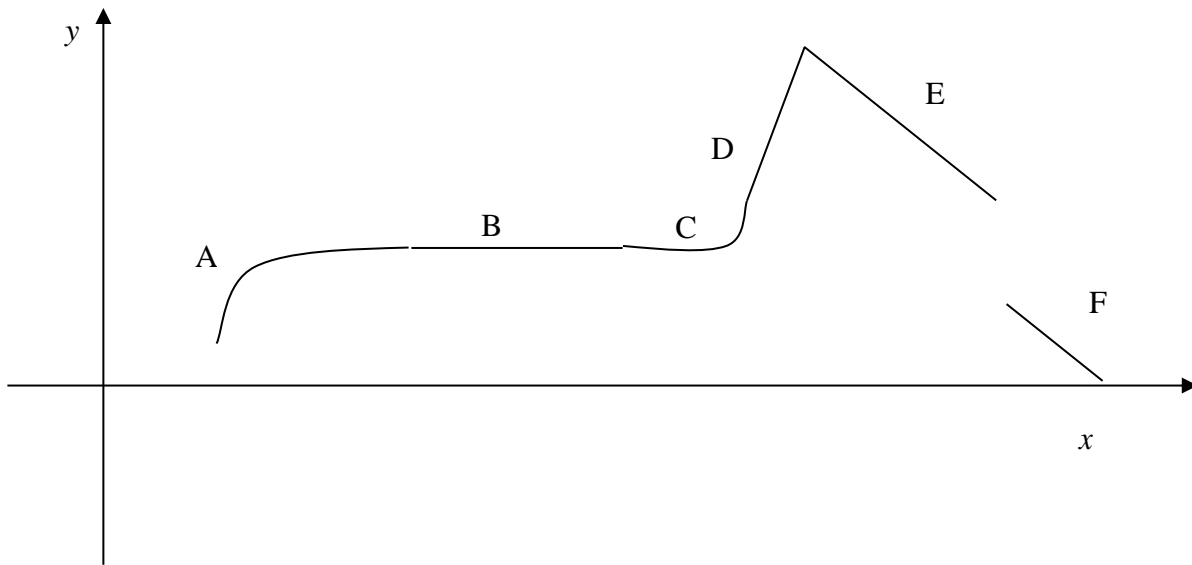
- a. $f'(x)$ if $f(x) = 2x^3 + 1$.
- b. $f'(2)$ given that $y = 3x^2 + 2x - 1$

6. Where is a function not differentiable?

7. The graph of function y below is split in to 6 sections; A, B, C, D, E and F

- a) Which interval(s) represent the instantaneous rate of change equal to zero.
- b) Which interval(s) represent the instantaneous rate of change increasing.
- c) Which interval(s) represent the instantaneous rate of change decreasing.
- d) Which interval(s) represent the instantaneous rate of change is constant but not equal to zero.
- e) **Circle** any points on the graph where the derivative is undefined.

Ans. a) _____ b) _____ c) _____ d) _____



Sketch below the derivative of the function given above.

