

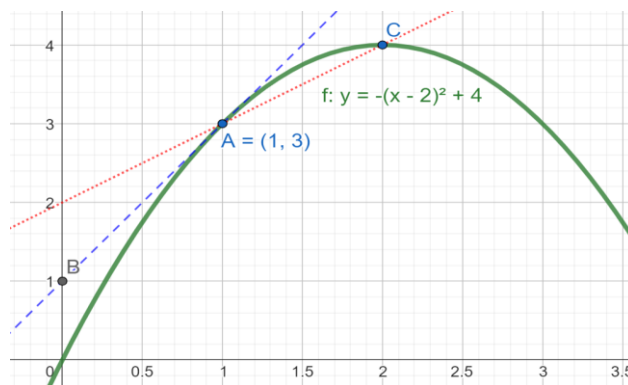
6/03/24 Name _____ APID _____

US24 MTH 124 Activity 3 (3.4/3.5/3.6) (ALL WORK REQUIRED)

Note: (1) If you think the answer doesn't exist, just demonstrate your work and write "DNE" or "doesn't exist".

(2) Each question is worth 5 points. And the final score will be rescaled to the total 20 points and then rounded to 2 decimal place.

1) (20points) Use the information in the graph to answer the following questions.



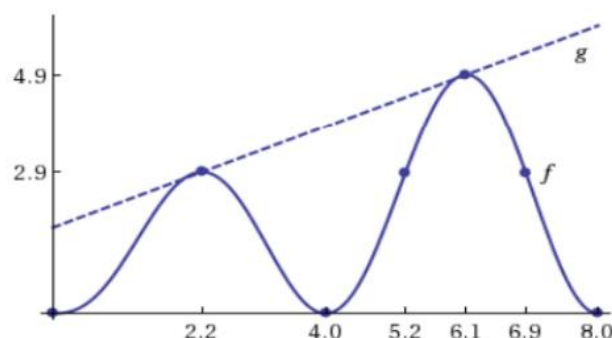
[i] What is the **instantaneous** rate of change of the function f at the point $A(1,3)$? What information do use and what is the geometric meaning of that?

[ii] What is the **average** rate of change of the function f from the point $A(1,3)$ to $C(2,4)$? What information do use and what is the geometric meaning of that?

2) (15points) Compute $f'(a)$ algebraically for the given value of a .

[i] $f(x) = x^2 - 2x$, $a = 3$ [ii] $f(x) = \frac{2}{x}$, $a = -1$ [iii] $f(x) = px + q$, $a = 100$

3) (25points) Comparing average rate of change of two functions, f and g.



For each interval given below, decide whether the average rate of change of $f(x)$ or $g(x)$ is greater over that particular interval.

Interval	Which function has GREATER average rate of change?
$0 \leq x \leq 8$	<input type="checkbox"/> f <input type="checkbox"/> g <input type="checkbox"/> both have an equal rate of change.
$5.2 \leq x \leq 8$	<input type="checkbox"/> f <input type="checkbox"/> g <input type="checkbox"/> both have an equal rate of change.
$5.2 \leq x \leq 6.1$	<input type="checkbox"/> f <input type="checkbox"/> g <input type="checkbox"/> both have an equal rate of change.
$5.2 \leq x \leq 6.9$	<input type="checkbox"/> f <input type="checkbox"/> g <input type="checkbox"/> both have an equal rate of change.
$2.2 \leq x \leq 6.1$	<input type="checkbox"/> f <input type="checkbox"/> g <input type="checkbox"/> both have an equal rate of change.

4) (10points) **Rounded the answers in this problem to 1 decimal places.**

On a road, the position of a car is described by the following equation:

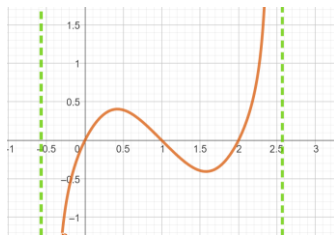
$$P(t) = x^3 + x.$$

[i] Estimate $\frac{P(3) - P(2)}{3 - 2}$ and interpret the answer in this context.

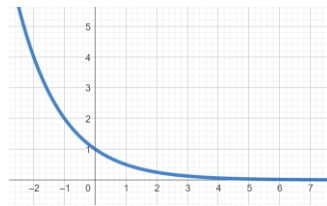


[ii] Estimate $\lim_{h \rightarrow 0^+} \frac{P(2+h) - P(2)}{h}$ and interpret the answer in this context.

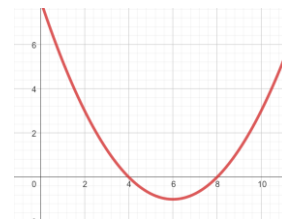
5) (15points) Pair the following pictures with the correct statements:



(1 ans)



(2 ans)



(3 ans)

- (A) For any time t , the instantaneous rate of change at time t is less than every average rate of change over every period after time t .
- (B) For any time t , the instantaneous rate of change at time t is less than every average rate of change over every period after time t . And the instantaneous rate of change is always negative.
- (C) There is at least one time at which the instantaneous rate of change is zero. Plus, the instantaneous rate of change can be any positive number you want.
- (D) There is at least one time at which the instantaneous rate of change is zero. Plus, the instantaneous rate of change can be any negative number you want.