

1. Your Group Info

(a) Write down the names of the other people in your group.

(b) Write down the name of your group.

(c) Fill out the front page and turn it in.

2. Review Big Ideas from Calculus I

(a) List ways in which you can use or interpret the derivative of a function. What information does it give you? What sort of questions can it answer? What sort of problems can it help you solve?

- $f'(x)$ gives the slope of tangent to $f(x)$.
- $f'(x)$ can indicate if $f(x)$ is \uparrow or \downarrow .
- $f'(x)=0$ indicates when tangent is horizontal
- $f'(x)=0$ or $f'(x)$ undefined can be used to find max's & min's
- $f'(x)$ gives the rate of change of f wrt x .
- If f is position, f' is velocity, and f'' is acceleration.

(b) Explain what $\int f(x) dx$ and $\int_a^b f(x) dx$ are called and what they mean? If you are asked to evaluate them, what sort of answer do you get?

$\int f(x) dx$ indefinite integral. It gives a family of functions, usually denoted $F(x)+C$, where $F'=f$.

$\int_a^b f(x) dx$ is a definite integral. It gives a number that represents net area (or area above x -axis - area below x -axis.)

- (c) List ways in which you can use the definite integral, $\int_a^b f(x) dx$, of a function $f(x)$. What information does it give you? What sort of questions can it answer? What sort of problems can it help you solve? (You may have answered some of this in the previous question...)

\int gives net change.

If $f(x)$ is velocity, $\int_a^b f(x) dx$ gives net change in position between time a and time b .

If $f(x)$ is change in population wrt time

$\int_a^b f(x)$ gives net change in population between time a and time b

- (d) How would you explain to a student new to Calculus what the symbols $\lim_{x \rightarrow 2} f(x) = 5$ mean?

When x -values get close to 2 (on either side... like 1.9, 1.99, 1.999 and 2.1, 2.01, 2.001) the corresponding y -values ($f(1.9), f(1.99), \dots$) get close to 5.

- (e) List ways in which you can use or interpret a limit.

- def of derivative
- end behavior (when $x \rightarrow \pm\infty$)
- asymptotes (vert and horiz.)
- continuity