

Topic: Integrals, definite and indefinite.

Indefinite integral
(same as antiderivative)

- a family of fcn's,
with common
derivative.

e.g. antiderivative of
 x is $\frac{1}{2}x^2 + C$

e.g. indefinite
integral of
 $\cos x$ is $\sin x + C$

↑
family

Notation:

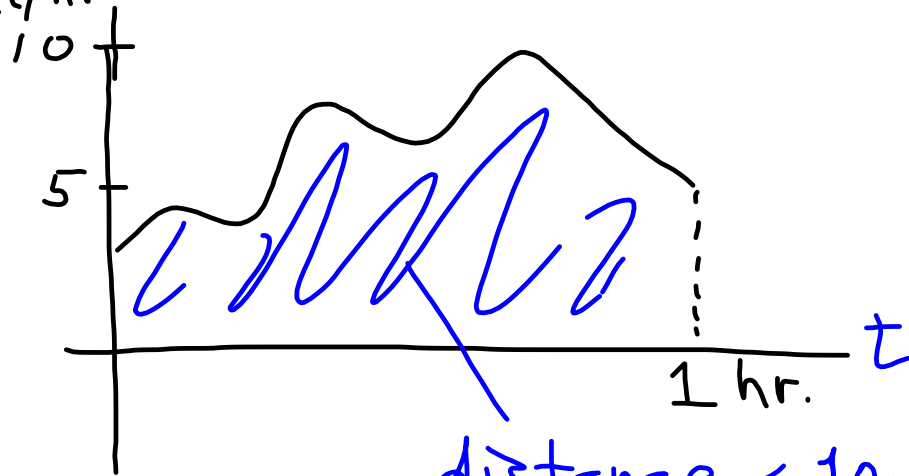
$$\int f(x) dx$$

"integral of $f(x) dx$ "

means indefinite integral
(aka antiderivative)

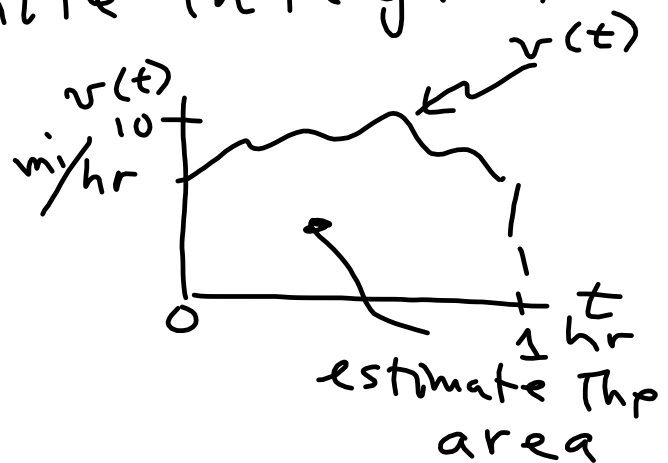
So: $\int \cos x dx = \sin x + C$

definite integral : an
mi/hr. accumulation.



distance $< 10 \times 1$
equal to area
between curve and
t-axis.

How to estimate a
definite integral.



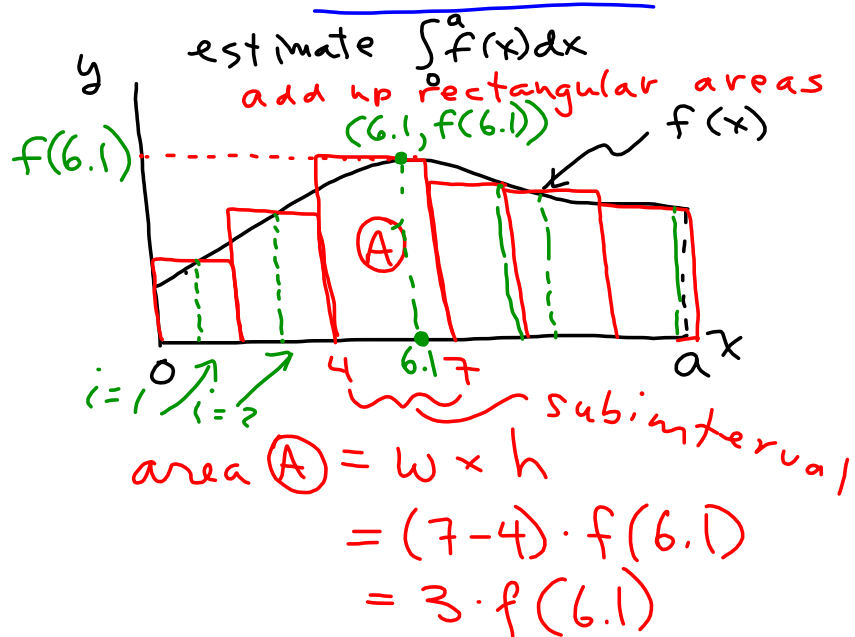
notation :

area = dist. traveled

definite. $\rightarrow = \int_0^1 v(t) dt$
has 0 and 1 limits

What is the output of a definite integral?

a number



how to
say it.

$$\int_0^a f(x) dx$$

"integral from 0 to a of $f(x) dx$ "

Topic : Riemann Sums.

Riemann Sum: division of
the interval into
sub-intervals, and the
height of each rectangle
is taken from some
point on the sub-interval

sum, with n sub-intervals

R.S. with n sub-intervals: $\sum_{i=1}^n \underbrace{\Delta x_i}_{\substack{\text{width} \\ \text{of} \\ \text{sub-interval}}} \cdot \underbrace{f(c_i)}_{\substack{\text{height of} \\ \text{rectangle } j \\ c_i = \text{an} \\ \text{x-value on} \\ \text{sub-interval}}}$

$$\int_0^a f(x) dx = \lim_{n \rightarrow \infty} \left(\sum \right)$$