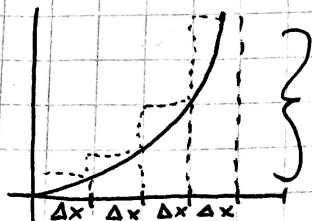


# Unit 6 Lesson 2 - The Definite Integral (ideas, notations, & rules) 1/2/16

## Rectangles



$$\text{Area rectangle} = y \cdot \Delta x = f(x) \cdot \Delta x = f(x) \cdot dx$$

height = y base =  $\Delta x$

$dx = \Delta x$  as long as  $\Delta x$  is infinitesimally small

## Definite integral

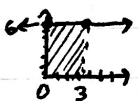
$$\int_a^b f(x) dx$$

"Accumulate the area of infinitely skinny rectangles starting at  $x=a$ , ending at  $x=b$ "

## Area of Linear Functions

$$f(x) = 6$$

$$\int_0^3 6 dx$$



$$w=3 \quad l=6 \quad A=$$

## Area of another linear function

$$f(x) = 2x + 1$$

$$\int_0^3 2x + 1 dx$$



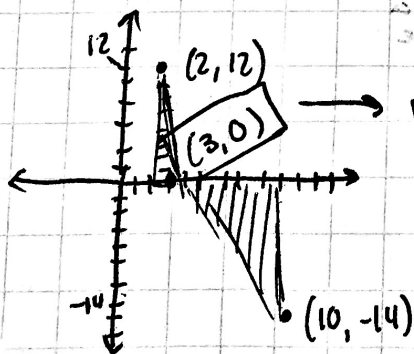
$$\left(\frac{1}{2}\right)\left(\frac{1}{2}\right)(2) = 10$$

Area of trapezoid  
(avg bases)  $\left(\frac{1}{2}\right)(\Delta x)$

## Area of a third linear function

$$\int_2^{10} 6 - 2x dx$$

Area above x-axis  $\rightarrow$  Area +  
Area below x-axis  $\rightarrow$  Area -



need to know when change from + to -

two different triangle areas -  
one positive 1, one negative 49

$$\int_2^{10} 6 - 2x dx = -48$$