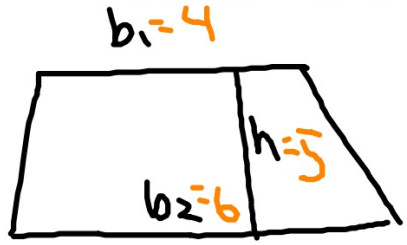
4.6 Trapezoid Rule

WCID? I can find area under a curve using trapezoids

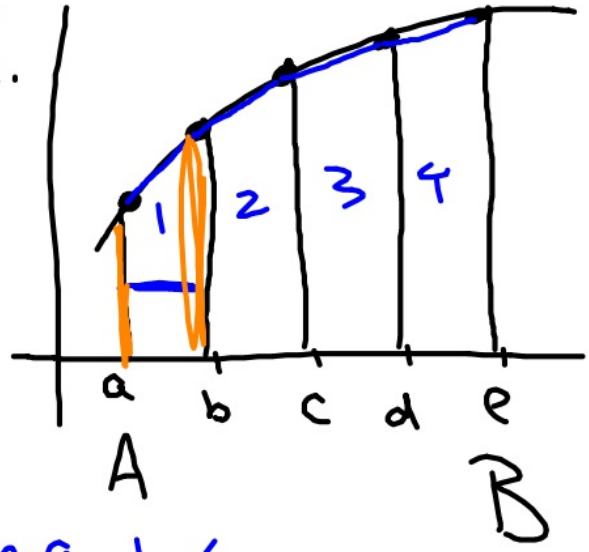
A.



$$A = \frac{1}{2}(b_1 + b_2) \cdot h$$

$$= 25$$

1.



$\frac{b-a}{n}$

$$\frac{b-a}{n}\cdot\frac{1}{2}\left(f(a)+f(b)\right)+\frac{b-a}{n}\cdot\frac{1}{2}\left(f(b)+f(c)\right)+$$

$$\frac{b-a}{n}\cdot\frac{1}{2}\left(f(c)+f(d)\right)+\frac{b-a}{n}\cdot\frac{1}{2}\left(f(d)+f(e)\right)$$

$$\frac{b-a}{2n}\left[f(a)+2f(b)+2f(c)+2f(d)+f(e)\right]$$

Ex. $\int_0^2 x^2\,dx$, $n=4$, trapezoid Rule

$\frac{b-a}{n} = \frac{2-0}{4} = \frac{1}{2}$

$A_T = \frac{1}{2}\cdot\frac{1}{2}\left[f(0)+2f\left(\frac{1}{2}\right)+2f\left(\frac{2}{2}\right)+2f\left(\frac{3}{2}\right)+f(2)\right]$

$= \frac{1}{4}\left[0+2\left(\frac{1}{4}\right)+2(1)+2\left(\frac{9}{4}\right)+4\right]$

$= \frac{1}{4}\left[0+\frac{1}{2}+2+4.50+4\right]$

$= 11/4$

Ex. $\int_0^1 (x^2+1)\,dx \quad n=5$

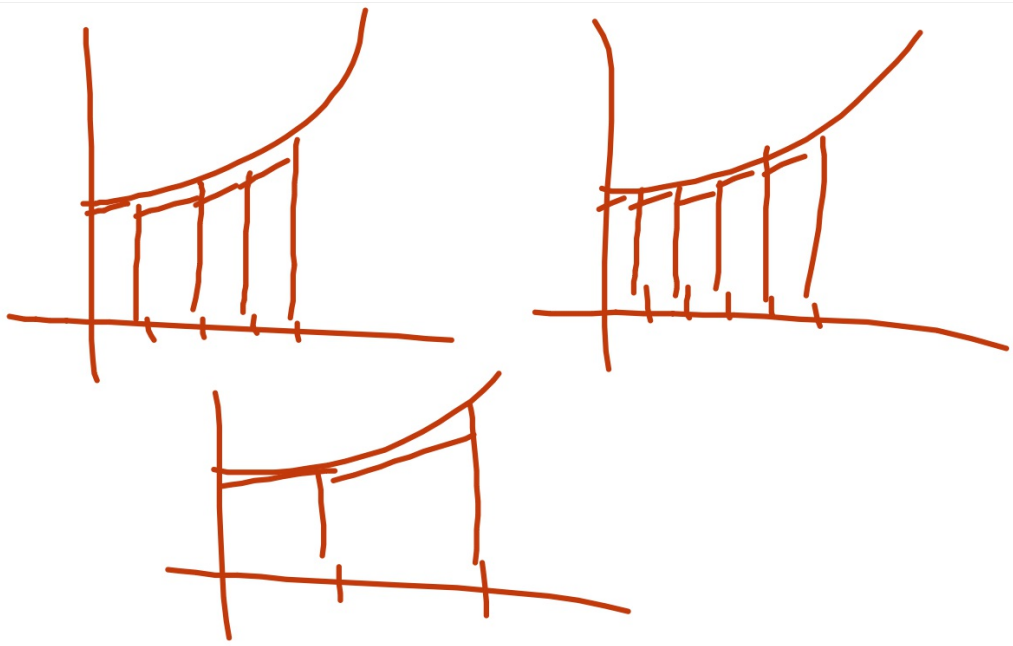
$\frac{b-a}{n} = \frac{1-0}{5} = \frac{1}{5} = .2$

$\frac{1}{5}\cdot\frac{1}{2}\left[f(0)+2f(.2)+2f(.4)+2f(.6)+2f(.8)+f(1)\right]$

$\frac{1}{10}\left[1+2(1.04)+2(1.16)+2(1.36)+2(1.64)+2\right]$

$\frac{1}{10}\left[1+2.08+2.32+2.72+3.28+2\right]$

$= 1.34$



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3-8 (not 4)