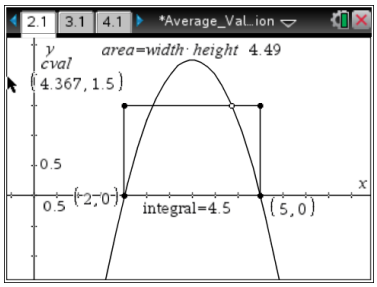
5.3b Definite Integrals & Antiderivatives

Average (Mean) Value



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how do you find the average of: 10,12,18,20

sum all the values and divide by 4

the idea is similar for a function:

if f is integrable on [a,b] then its avg. value on [a,b] is:

$$av(f)=\frac{1}{b-a}\int_a^b f(x)dx$$

divide by how many values there are

sum all values

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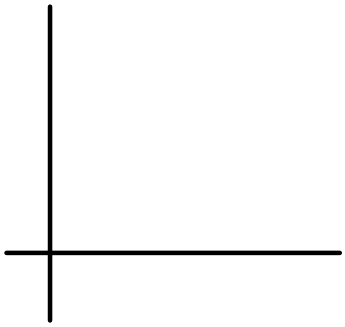
graphically?

$$av(f) = f(c) = \frac{1}{b-a}\int_a^b f(x)dx$$



$$av(f)(b-a) = f(c)(b-a) = \int_a^b f(x)dx$$

Mean Value Thm for Definite Integrals

if f is continuous on [a,b], then there is some c value in [a,b]

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Find the average value of $f(x) = 6 - x^2$ on [0, 5]

Where does the average occur?

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Find the average: $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} (\cos x)\,dx$

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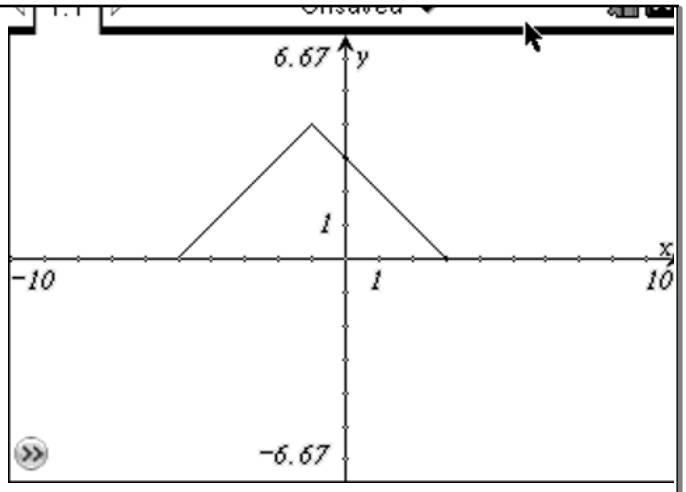

Find the avg. value of the function on [-5,3], using geometry:

$$f(x) = \begin{cases} -x+3, & -1 \le x \le 3 \\ x+5, & -5 \le x < 1 \end{cases}$$

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